CYCLES

—A MONTHLY REPORT

DECEMBER • 1950

FOUNDATION FOR THE STUDY OF CYCLES

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CYCLES - A MONTHLY REPORT

Vol. 1 December • 1950 No. 5

The Director's Letter

Dear Member:

I am happy that the year should end with what seems to me our most important report to date.

This issue contains, in highly abbreviated form, the results of our research in respect to the 6-year cycle as it appears in some thirty different phenomena.

The research in regard to the 6-year cycle is important for several reasons. First of all, knowledge of a wave which accounts for so large a percentage of the fluctuations of so many economic time series is indispensable if we are to make adequate forecasts in regard to the future behavior of the industries involved.

More than this however, the presence of a 6-year wave in both natural and social phenomena gives us reason to suppose that human beings surge forward or retrench in response to hereto unsuspected environmental forces.

The fact that disturbances on the sun also respond to forces of seemingly the same time span suggests the possibility that the ultimate cause of these behaviors may lie outside the earth.

More intensive work is needed to identify this 6-year rhythm over long periods of time, both on earth and in the sun, and to find out whether or not the wave lengths in the various series are identical. This task is one of the jobs ahead for 1951.

I am sorry that I was unable to complete the research in respect to cycles in war in time for inclusion in this report. An article on this subject, however, will be the lead article for the report of January 1951.

The January issue will also contain, as Foundation Reprint No. 35, a 20-page article by Professor Raymond H. Wheeler showing the correspondence that has existed between wars and climatic changes. You may remember from what I said in November that it is Professor Wheeler's index of international battles that we are using as the basis of our study of the cycles in war.

We have found a 23-year cycle in the violence of international warfare. Professor Wheeler shows a correspondence between wars and climatic changes. Dr. C. G. Abbot has found a 23-year cycle in the alternate thickness and thinness of tree rings, presumably also the result of climatic changes.

It therefore seems desirable that you should see Dr. Abbot's article in regard to tree rings, as a prelude to Dr. Wheeler's article and my own report in regard to the cycles in war. Dr. Abbot's article is therefore included herewith on page 27 as Foundation Reprint No. 34.

With season's greetings and best wishes for a prosperous and succesful 1951, I am,

Cordially yours,

Edward R. Dewey

Director

THE 6-YEAR CYCLE

A RHYTHM of about six years in length has been found to be characteristic of many phenomena. In some instances this rhythm has repeated itself so many times and so regularly that it cannot reasonably be the result of chance. It may therefore be expected to continue. This fact makes a knowledge of this rhythm an important means of throwing light upon the probabilities of the future.

What causes this peculiar behavior? No one yet knows. But the study of cycles can help us, for when two or more phenomena fluctuate in cycles of exactly the same wave length, we are put on notice that the given phenomena may be interrelated. Thus when we find the 6-year cycle in natural as well as social phenomena we have the right to wonder if there may not be an environmental cause for the behavior observed in human beings.

So far I have reported to you in regard to this rhythm only as it appears in cotton prices, in orders received by the General Electric Company, and in the sales of automobiles.

On the twelve plates which follow you can see this rhythm as it appears in thirty additional series of figures. Also, for purposes of uniformity and comparison, the 6-year rhythm in the General Electric orders received is shown in addition.

As far as the industrial figures are concerned, this study was a cooperative venture. The data were furnished by the companies studied (except Seaboard Air Line); we conducted the cycle research.

By rights the result of this research should be presented to you in the form of thirty separate reports. In each instance, these reports should show charts of the original data--and perhaps the actual figures as well--and should explain the work in detail. Thus, each of these separate reports should take several pages and be as full and complete, for example, as was the report upon the 6-year rhythm in the orders received by the General Electric Company.

However, lack of time and space forbids. I am therefore giving you these condensed sumary sheets as a stopgap. I shall follow them with detailed reports in regard to each of the thirty different series as soon as I can.

There are several points in regard to this rhythm worthy of remark. Let me take them up in order.

First of all you must remember that for the most part the curves shown herewith do not show absolute highs and lows. Mostly they show you the highs and lows relative to a 6-year moving average trend. Mostly they are expressed in percentages. Therefore, for the most part, you cannot use the waves shown in this report for forecasting unless you also forecast the moving averages around which they are wrapped.

The fact that the curves shown are percentages of the moving average trend has the further consequence that you lose three years at each end of each series. Thus, although this work was done last year (1949) using values through 1948, there can be no percentage values shown for 1946, 1947, and 1948 because we cannot have any moving average trend values for those years. Most of the curves therefore end with the year 1945.

Next year, when values for 1949 and 1950 are available, two more points can be added to the various charts, and the percentage deviations from trend can be posted for you through 1947.

With some of the shorter series it would perhaps have been better, except for the sake of uniformity, to use a fitted trend instead of a moving average trend. In that way we could have shown you an entire additional cycle in the final result.

A second point for you to remember in regard to each of these curves is the fact that there have been distortions in the past and that there will most certainly be distortions in the years to come, even though the rhythms continue in full force and effect in the future as in the past.

My third point has to do with significance.

The longer series provide their own internal evidence of significance. In the General Electric series for example it is unlikely that there could be nine successive repetitions of a 6-year wave of the demonstrated regularity merely as a result of random forces.

The shorter series give you no such ininternal evidence, but they are part of the same economy and presumably are actuated by the same basic forces that govern the older companies.

However it is when you leave the field of economics entirely and find what seems to be the same behavior in barometric pressure, in tree ring widths, and in sunspots, that you begin to realize that in this behavior we are probably dealing with something very fundamental.

In tree rings you will remember (Foundation Report No.7) that we have a 6-year cycle present on the average in each of six 180-year sections back to 800 A.D. The exact length of the average cycle in the tree rings is 6.03 years. If future work shows the tree ring cycle to be truly rhythmic, we will have had 180 repetitions in the data so far studied. This should be enough to satisfy even Saint Thomas.

Fourth, I would like to call your attention to timing.

In my own mind I think of this rhythm as having ideal crests in this century in all years divisible by six. This would put the last crest of the ideal wave in 1948, the next ideal crest in 1954.

However, as you can see from the details to follow, in many series the ideal crests of certain series of figures often come a year before or a year after normal timing.

For tree rings at Fairlee, Vermont, reversed, and sunspots (with alternate cycle reversed) normal timing for the 6-year wave is 1948. However, in barometric pressure at New York, ideal timing would call for a crest of the 6-year wave in 1947.

Rayon production has an ideal crest in 1947, along with cotton prices, but the corresponding cotton production crests would ideally be due in 1949 — these series thus straddling the normal ideal time of crest in 1948.

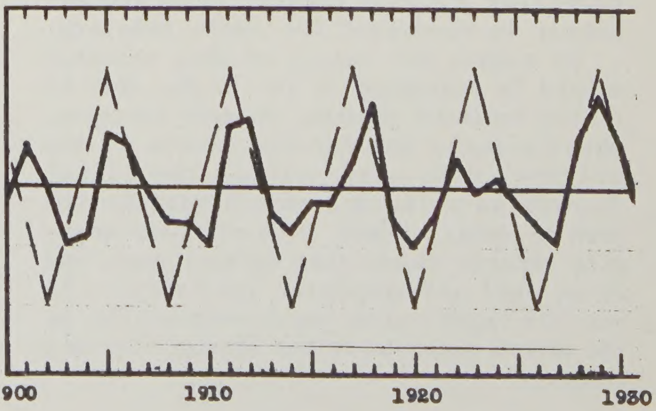
About a third of the industrial companies show ideal crests in 1948, but another third show ideal crests in 1947, and a final third have ideal crests in 1949.

More in detail, economic series with ideal 6-year crests in 1947 include:

American Viscose Corporation, shipments in pounds.
Bethlehem Steel Company, production in net tons.
E.I. du Pont de Nemours & Company, dollar sales to customers.
Inland Steel Company, net dollar sales.
Jones & Laughlin Steel Corporation, total dollar sales.
Monsanto Chemical Company, dollar sales.
Montgomery Ward & Co., net dollar sales.
Pittsburgh Plate Glass Company, net dollar sales.

Series with ideal 6-year crests in 1948 include:

Allis-Chalmers Manufacturing Company, dollar sales billed.
Armour and Company, dollar sales.
General Electric Company, orders received, in dollars.
Republic Steel Corporation, ingot production, net tons.
Sears, Roebuck and Co., net sales.



STOCK MARKET

Annual Averages of Standard & Poor's Weekly Industrial Stock Price Index (1935-1939: 100)

Three 6-year section moving average of data, adjusted for 9-year rhythm, expressed as percentages of their 6-year moving average.

(Scale: percent)

Youngstown Sheet and Tube Company, gross dollar sales.
Wilson & Co., dollar sales.

Series with ideal 6-year crests in 1949 include:

Armco Steel Corporation, dollar sales.
Continental Oil Co., gross operating income.
B.F. Goodrich Company, net dollar sales.
Goodyear Tire & Rubber Company, net dollar sales.
National Lead Company, net sales.
Proctor & Gamble Company, gross dollar sales.
Seaboard Air Line, gross operating revenue.
Standard Oil Company of California, gross operating income.
Swift & Company, dollar sales.
United States Rubber Company, net dollar sales.

In most instances the ideal pattern is three years up and three years down, but there are some exceptions.

You can get details by reference to the charts, but bear in mind that in many series the available figures are so few that the variation from the normal symmetrical pattern cannot be considered to be significant.

Let me now review for you the actual charts as shown on the pages which follow:

First of all you will note that all the charts have the same horizontal scale. They all start at 1900 and all end at 1960.

All charts have the actual figures or percentages plotted in a solid line, and a diagrammatic representation of the ideal wave plotted in a broken line. In all instances these broken lines are projected into the future up to 1960 and can be projected as much further into the future as you wish.

Also, in all instances, the 6-year waves have been averaged and the average waves, correct for average past shape and amplitude, have been plotted one and five-sixth times in proper time position on a separate grid to the right of the main chart. This separate grid runs eleven years, from 1940 to 1950 inclusive.

Finally, all the curves except those on the first plate represent percentages. They all have the same vertical scale. Therefore they are all directly comparable with each other.

On the first plate the first curve—barometric pressure at New York, is expressed in inches, the second curve—tree rings, is expressed in percentages, at standard scale but upside down, and the third curve—sunspots, is expressed in relative sunspot numbers.

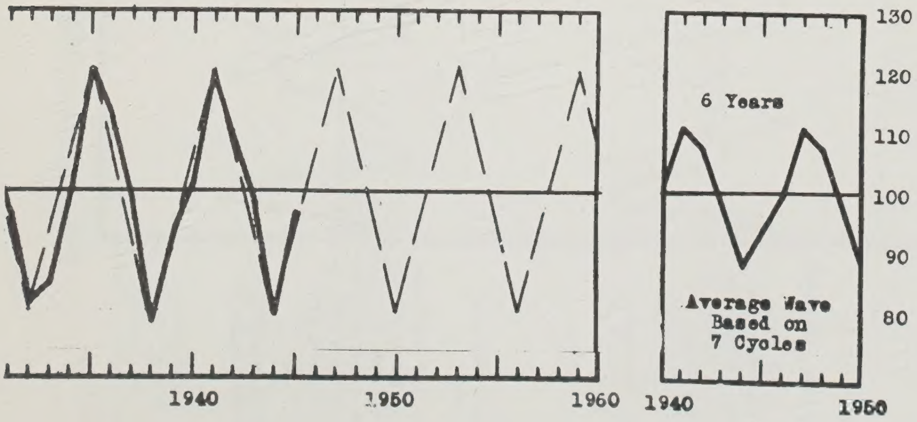
In addition to the thirty series of figures named above, the 6-year pattern is also present in the annual averages of Standard & Poor's Weekly Industrial Stock Price Index, but is so overshadowed by the 9-year wave and the 41-month wave that it cannot be clearly seen without prior elimination of these two waves.

When this elimination has been made we find the 6-year wave in stock prices to be symmetrical in shape with the last high of the average ideal wave in 1947. The average amplitude of the highs is 111%. The current low of the ideal wave is 1950. The average amplitude of the lows is 88%.

That is to say, assuming that this wave is continuing, stock prices in 1950 were, on the average, 12% lower than they would have been without the effect of this influence.

If the wave continues, average annual prices in 1953 will, as a result of this wave, be 11% above what they otherwise would be.

The 6-year wave in stock prices is shown below:



BAROMETRIC PRESSURE

At New York

Two 6-year section moving average of 3-year moving average of annual means of observations, adjusted for 6-year rhythm.

(Scale: inches)

TREE RINGS

At Fairlee, Vermont

Annual tree ring thicknesses, reversed, expressed as percentages of their 6-year moving average.

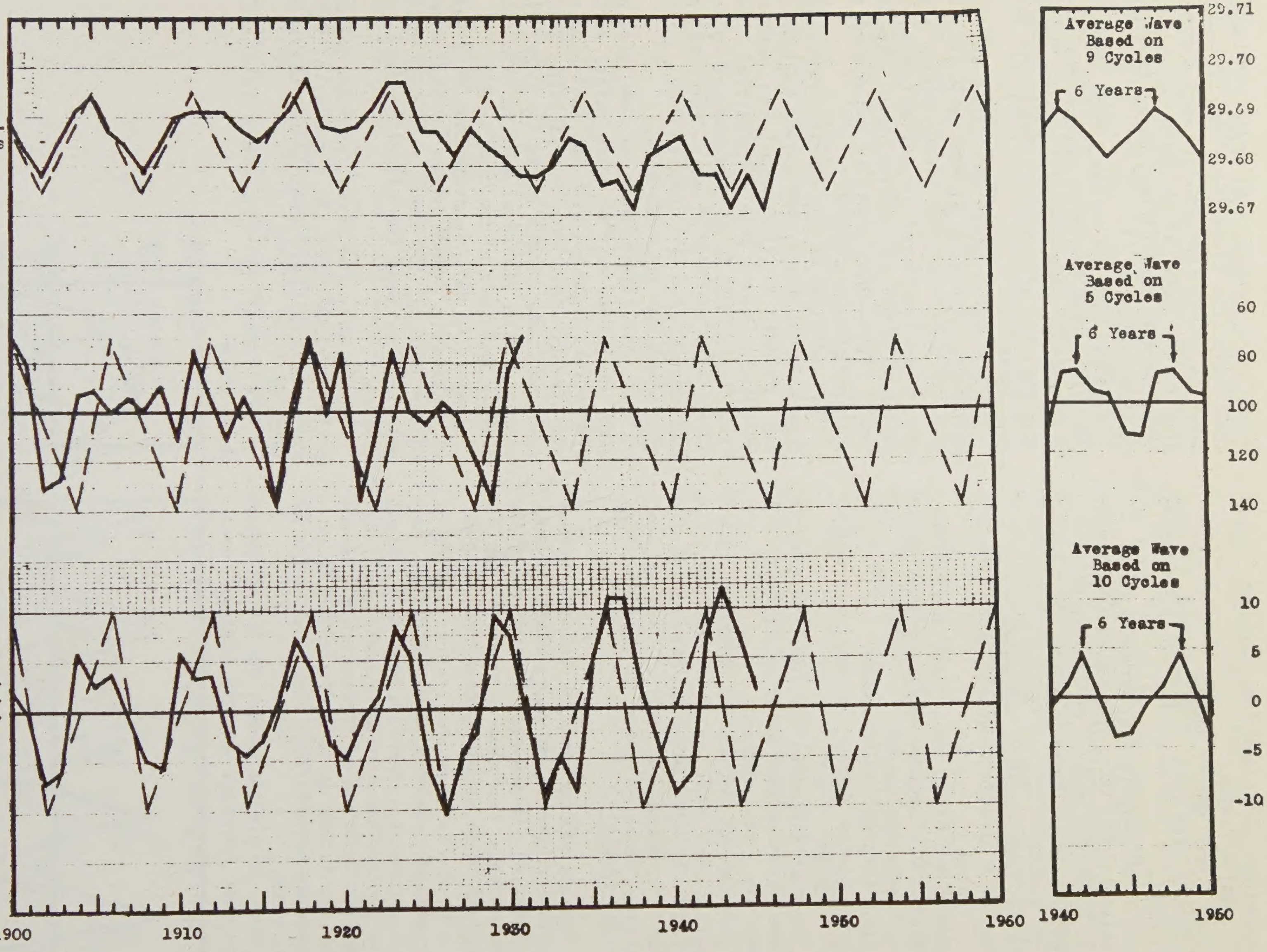
(Scale: percent)

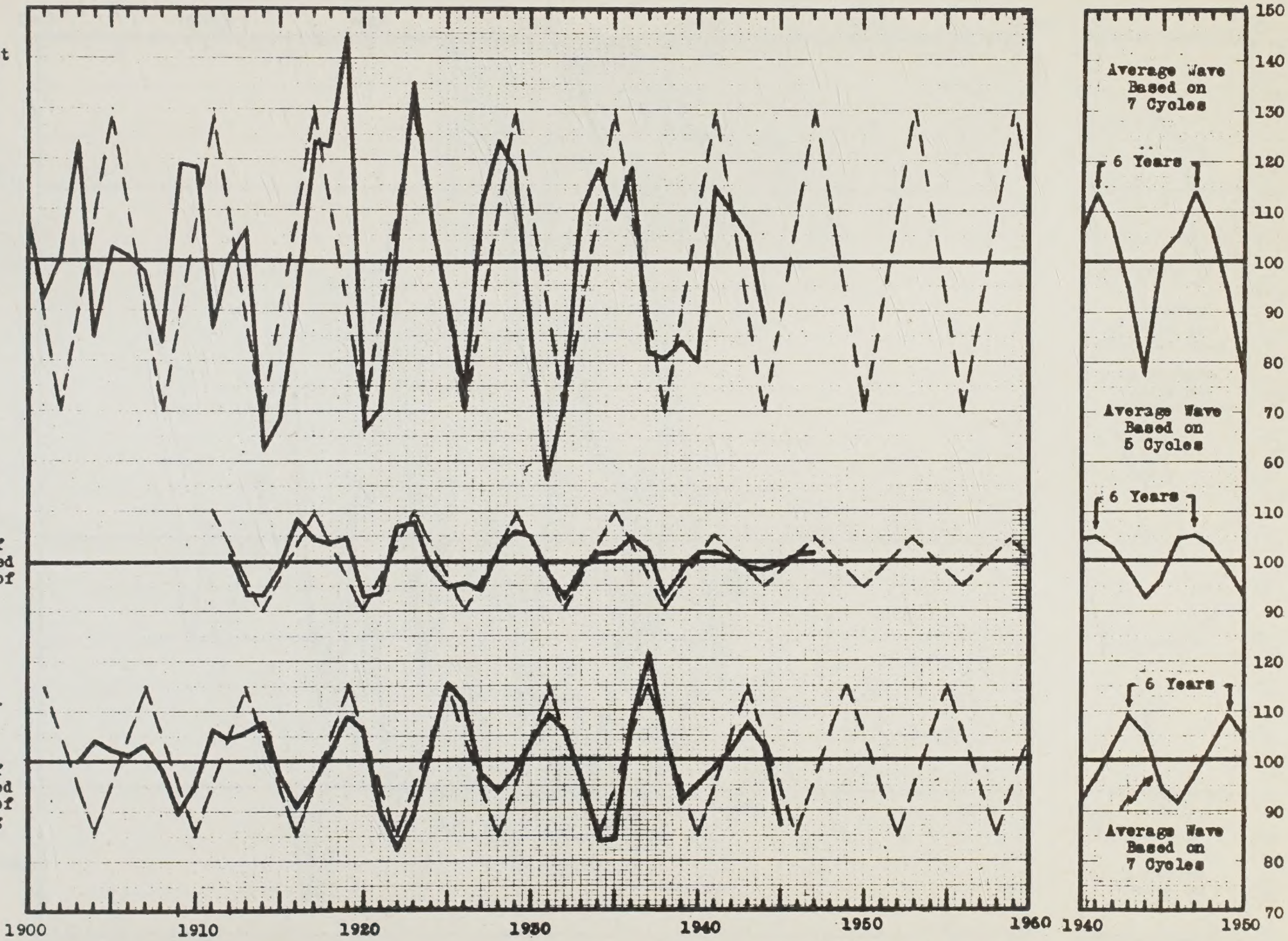
SUNSPOTS

Alternate Cycles Reversed

Four 6-year section moving average of deviations of relative sunspot-numbers from their 6-year moving average.

(Scale: relative sunspot-numbers)





COTTON PRICES

Average Annual Spot Price of Cotton per Pound, Crop Years beginning August.

Data expressed as percentages of their 6-year moving average.

(Scale: percent)

RAYON PRODUCTION

Production of Viscose Rayon Filament Yarn

Centered 2-year moving average of the data expressed as a percentage of secular trend.

(Scale: percent)

COTTON PRODUCTION

500-Pound Bales, Crop Years beginning August.

Centered 2-year moving average of the data expressed as a percentage of the 6-year moving average of the data.

(Scale: percent)

AMERICAN VISCOSE CORPORATION

Shipments in Pounds

Data expressed as percentages of their 6-year moving average. (Note concurrent 2-year rhythm)

(Scale: percent)

BETHLEHEM STEEL COMPANY

Production in Net Tons

Data expressed as percentages of their 6-year moving average.

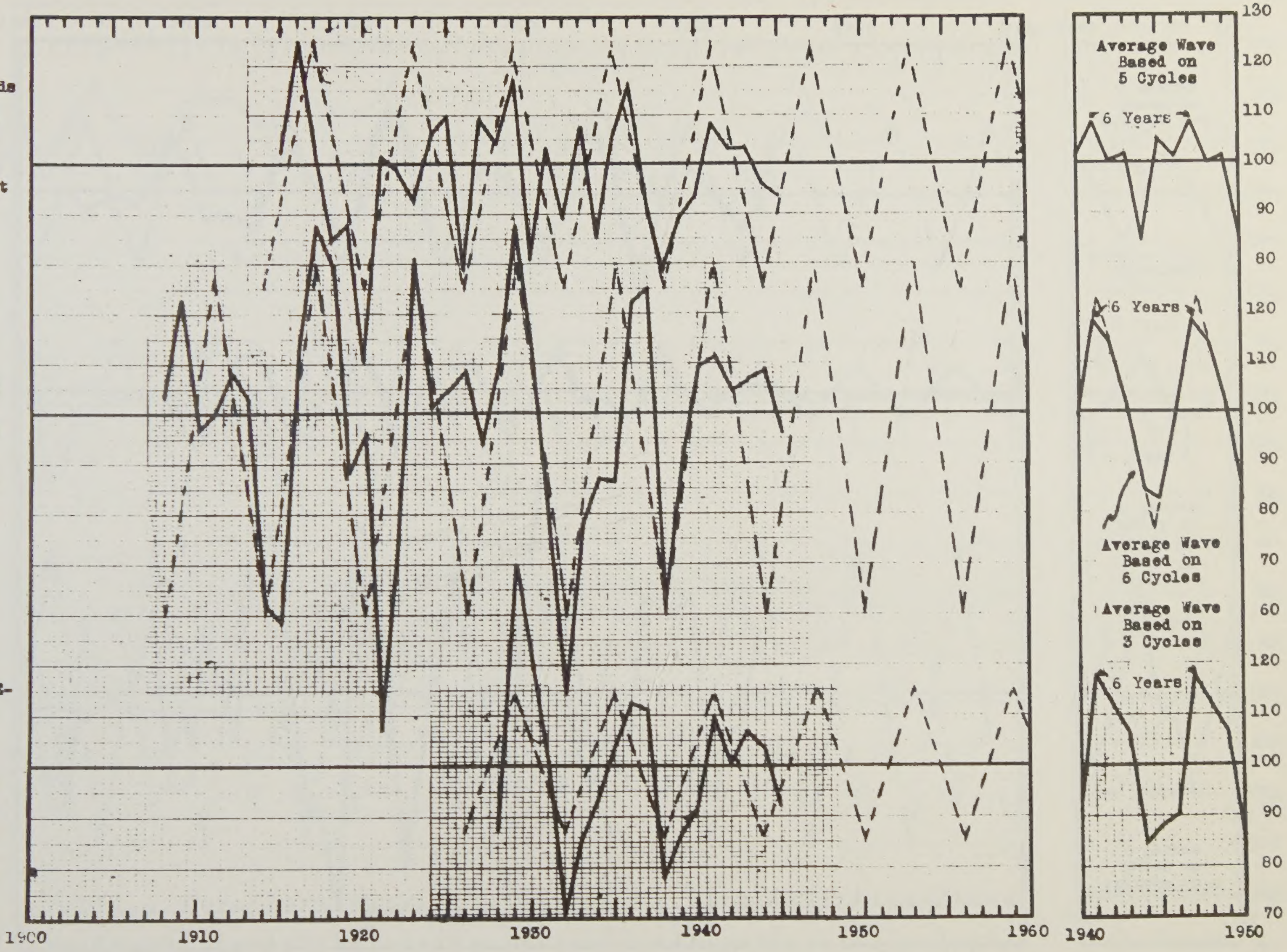
(Scale: percent)

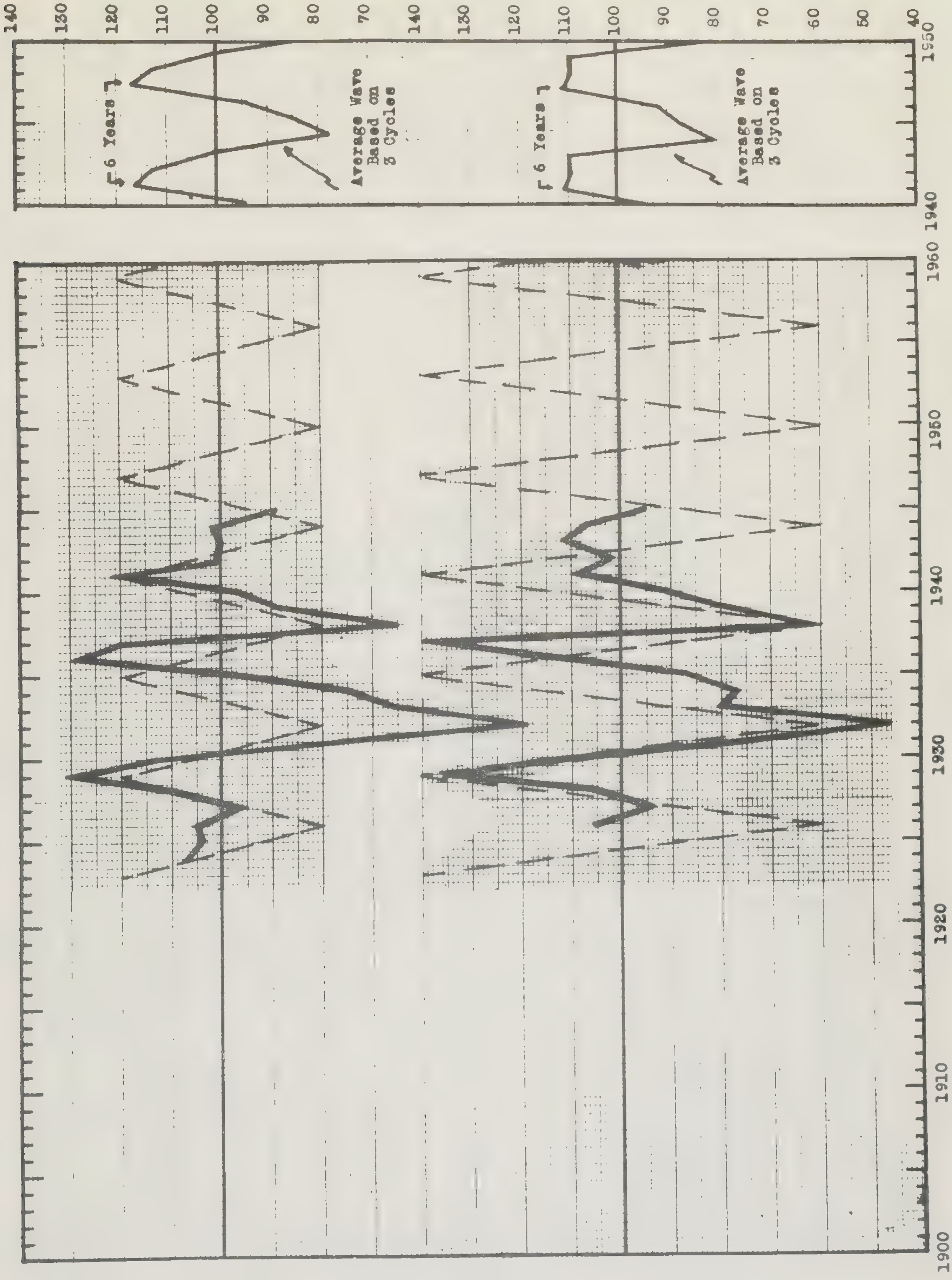
E. I. DU PONT DE NEMOURS & COMPANY

Dollar Sales to Customers

Data expressed as percentages of their 6-year moving average.

(Scale: percent)





INLAND STEEL COMPANY

Net Dollar Sales

Data expressed as percentages of their 6-year moving average.

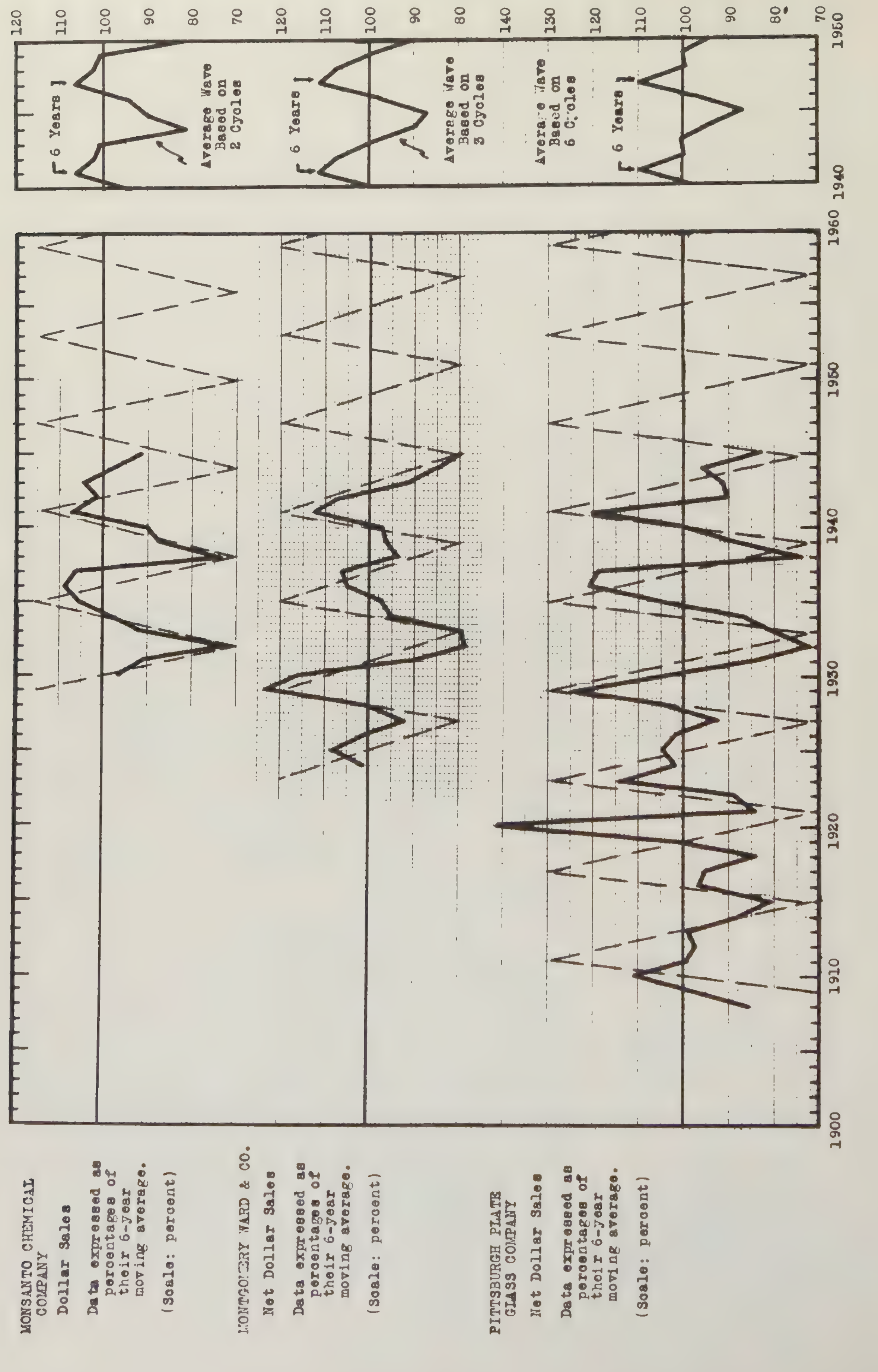
(Scale: percent)

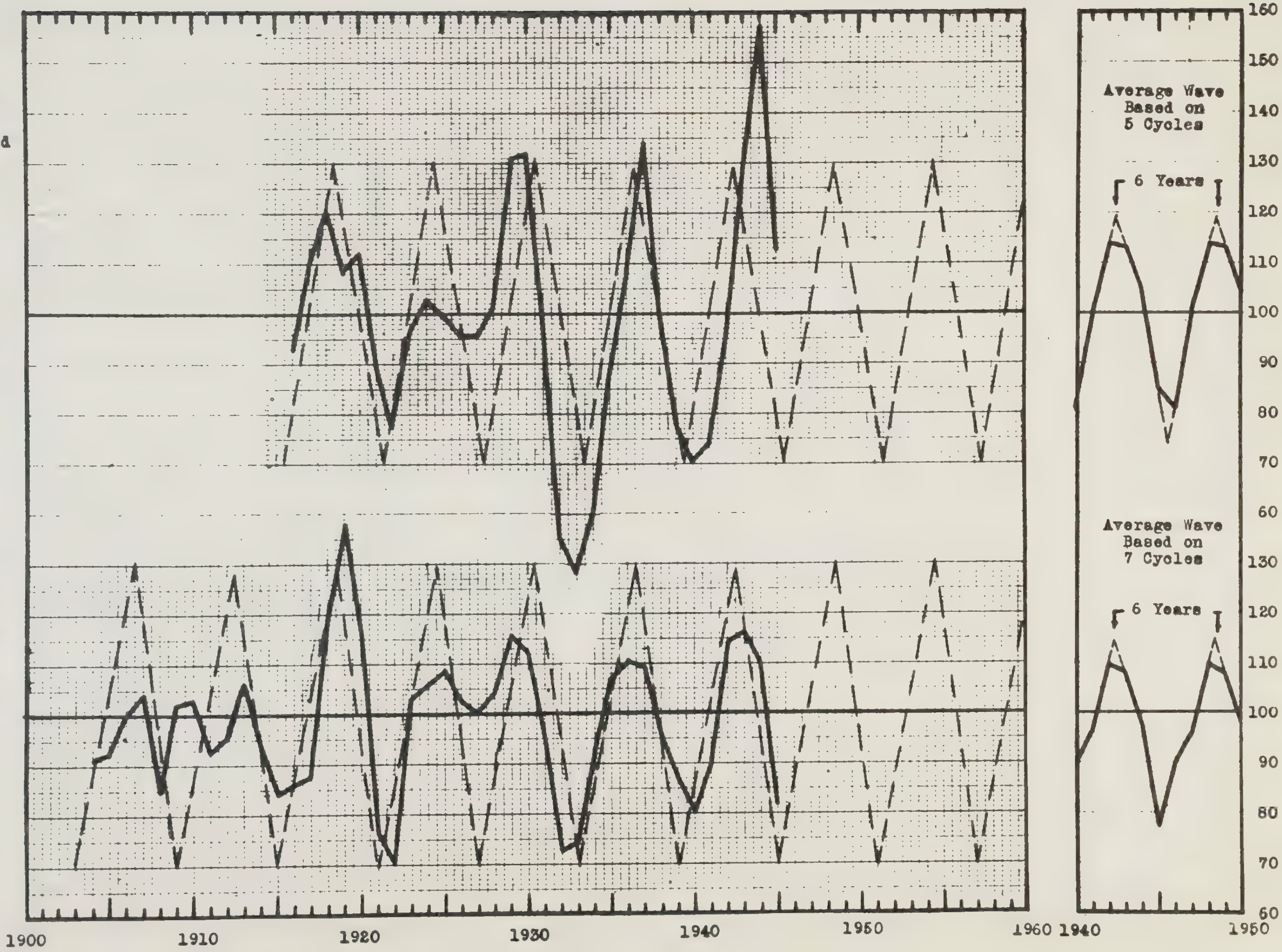
JONES & LAUGHLIN STEEL CORPORATION

Total Dollar Sales

Data expressed as percentages of their 6-year moving average.

(Scale: percent)


MONSANTO CHEMICAL COMPANY
Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
MONTGOMERY WARD & CO.
Net Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
PITTSBURGH PLATE GLASS COMPANY
Net Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
6 Years
Average Wave Based on 2 Cycles
6 Years
Average Wave Based on 3 Cycles
Average Wave Based on 6 Cycles
6 Years
120
110
100
90
80
70
120
110
100
90
80
140
130
120
110
100
90
80
70
1900
1910
1920
1930
1940
1950
1960
1940
1950



ALLIS-CHALMERS MANUFACTURING COMPANY

Dollar Sales Billed

Data expressed as percentages of their 6-year moving average.

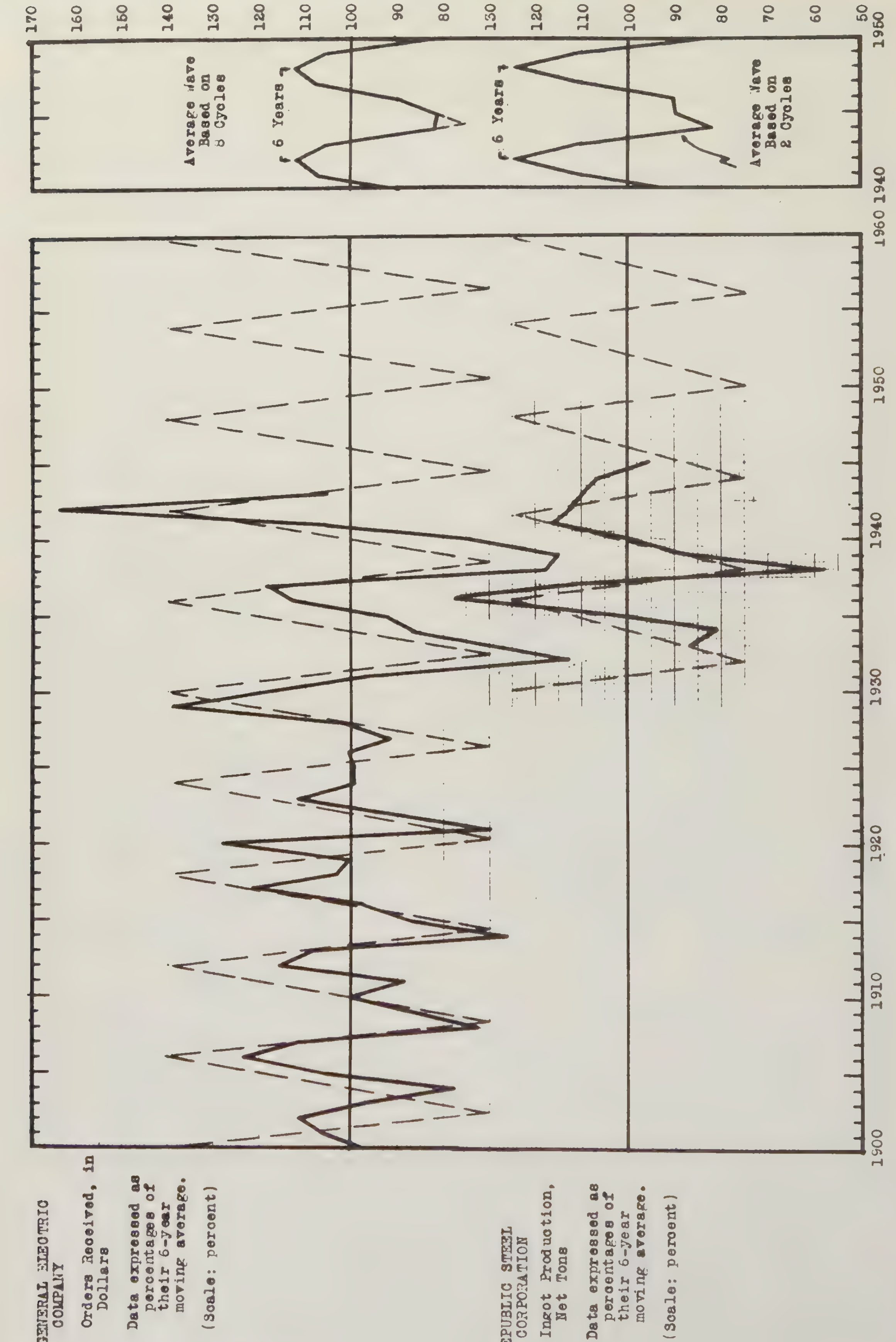
(Scale: percent)

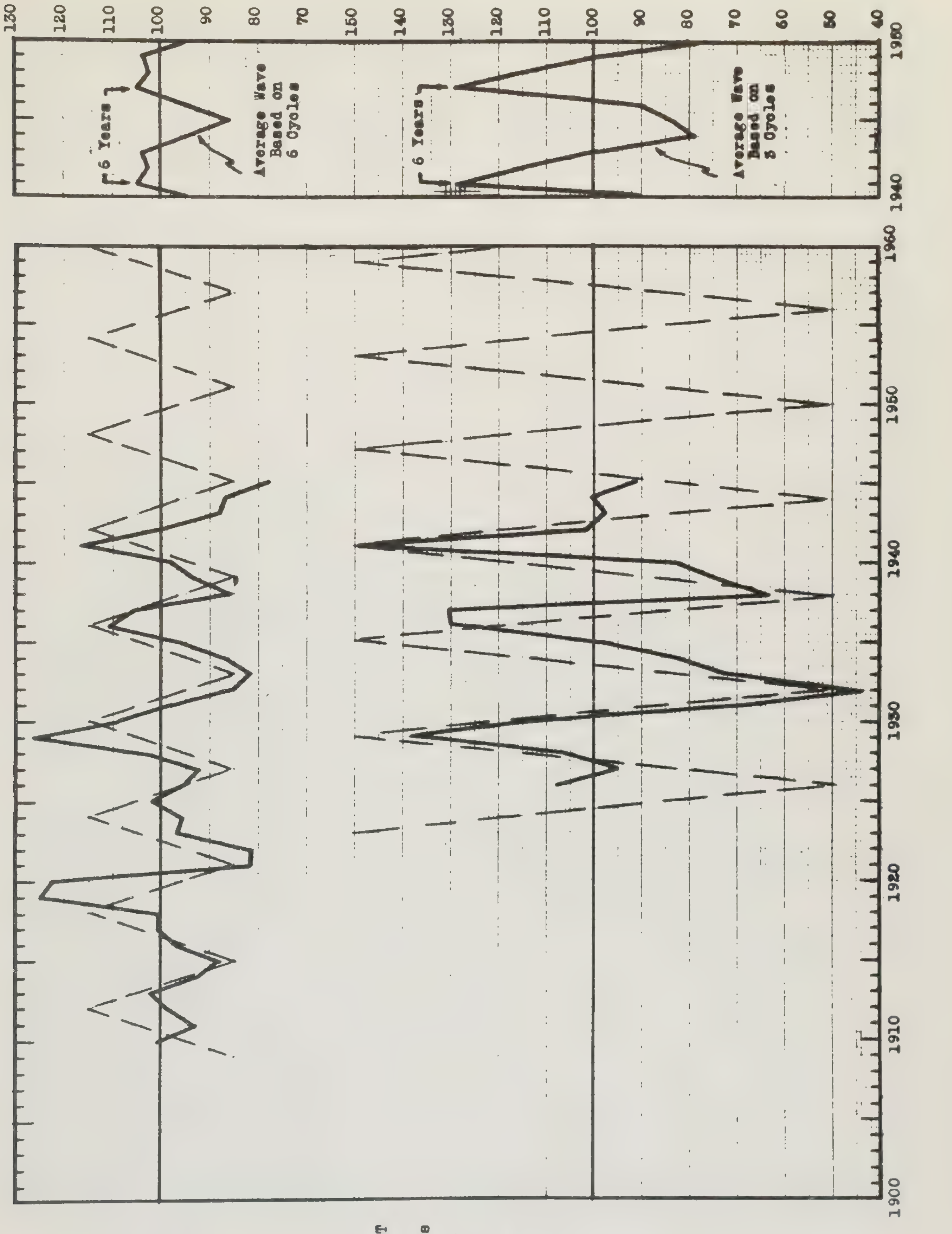
ARMOUR AND COMPANY

Dollar Sales

Data expressed as percentages of their 6-year moving average.

(Scale: percent)


GENERAL ELECTRIC COMPANY
Orders Received, in Dollars
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
REPUBLIC STEEL CORPORATION
Ingot Production, Net Tons
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
Average Wave Based on 8 Cycles
6 Years
6 Years
Average Wave Based on 2 Cycles
170
160
150
140
130
120
110
100
90
80
130
120
110
100
90
80
70
60
50
1900
1910
1920
1930
1940
1950
1960
1940
1950



SEARS, ROEBUCK
AND CO.

Net Sales

Data expressed as percentages of their 6-year moving average.

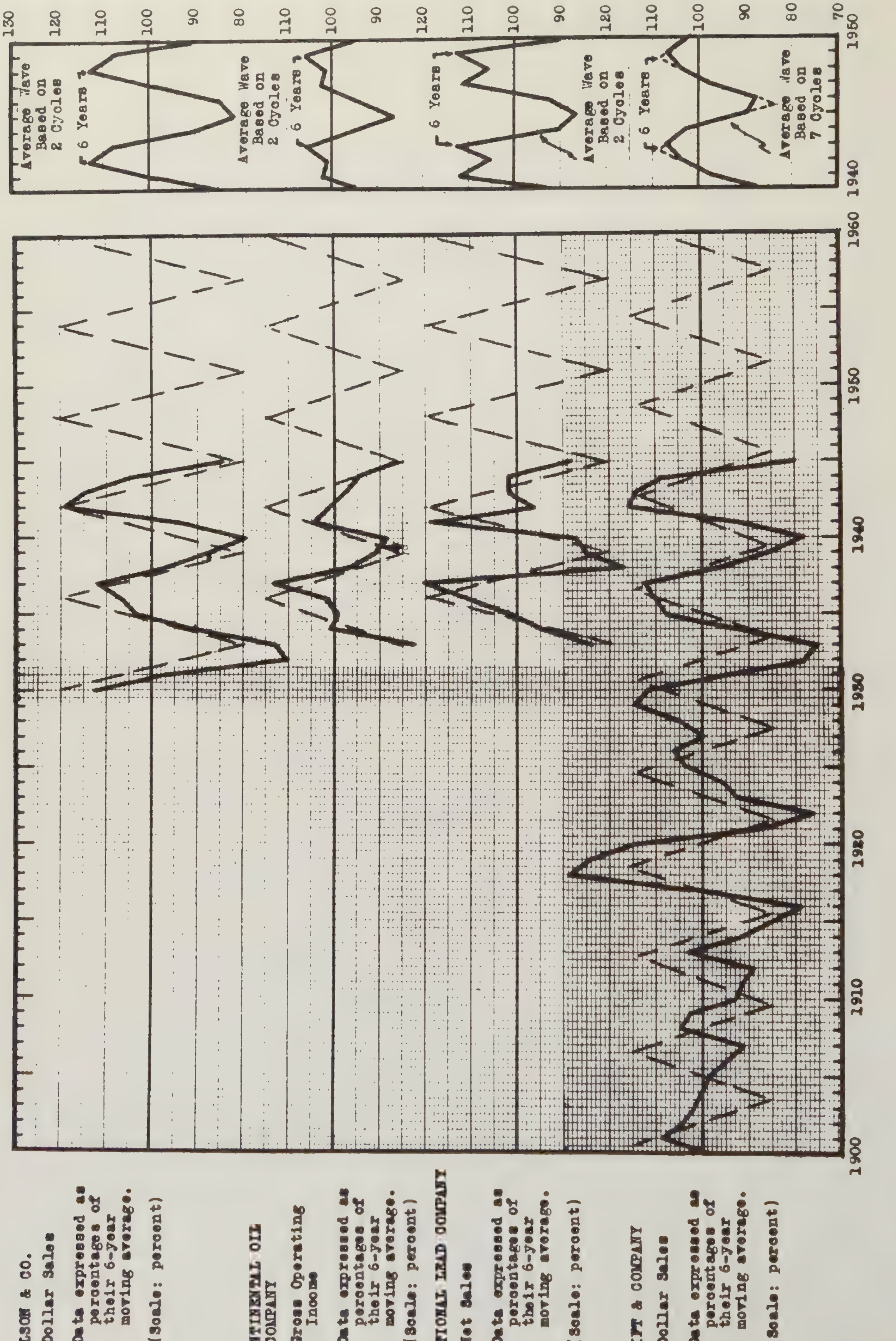
(Scale: percent)

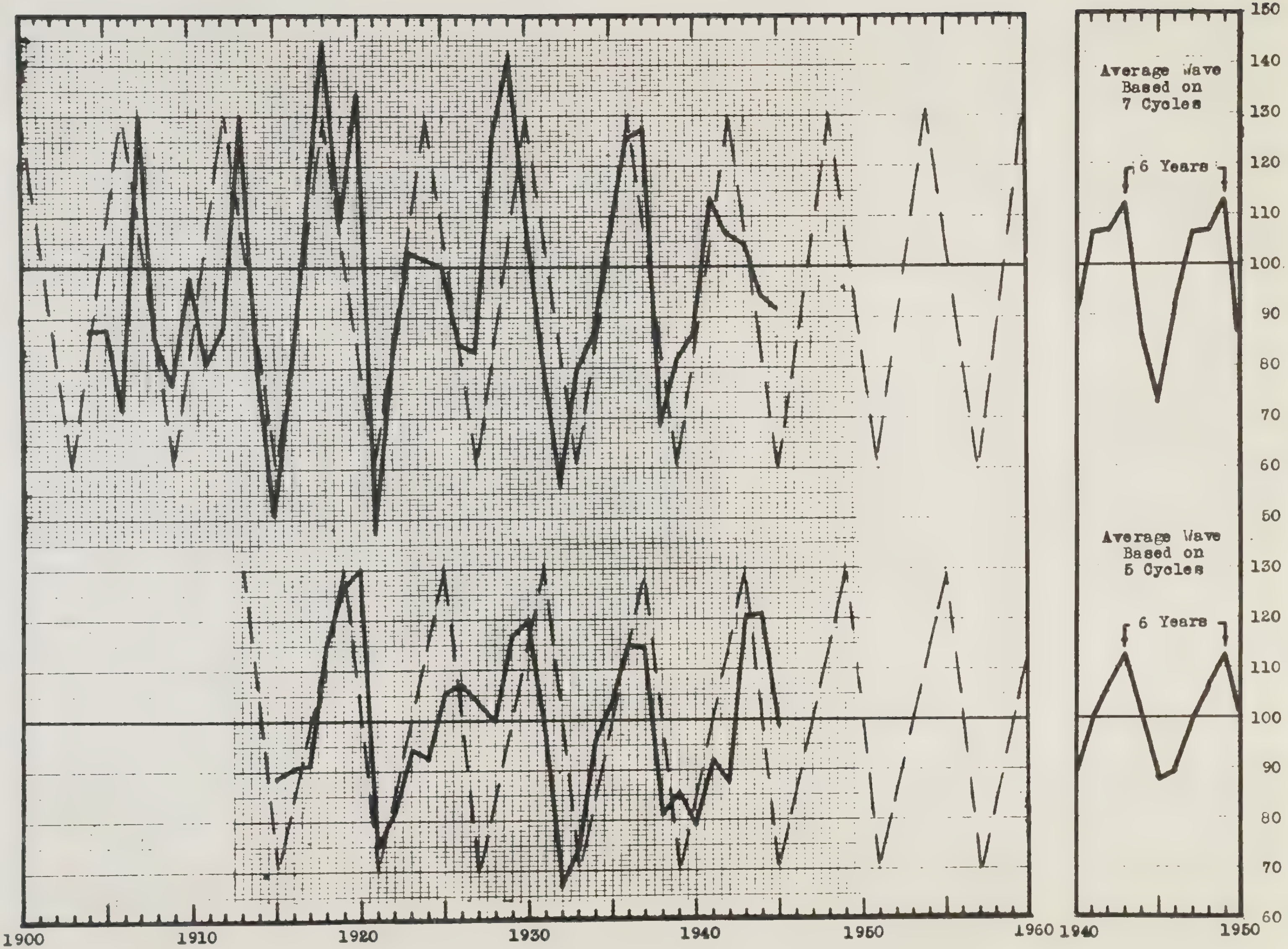
THE YOUNGSTOWN SHEET
AND TUBE COMPANY

Gross Dollar Sales

Data expressed as percentages of their 6-year moving average.

(Scale: percent)


WILSON & CO.
Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
CONTINENTAL OIL COMPANY
Gross Operating Income
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
NATIONAL LEAD COMPANY
Net Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
SWIFT & COMPANY
Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
Average Wave Based on 2 Cycles
6 Years
Average Wave Based on 2 Cycles
6 Years
6 Years
Average Wave Based on 2 Cycles
6 Years
Average Wave Based on 7 Cycles
130
120
110
100
90
80
110
100
90
120
110
100
90
120
110
100
90
80
70
1900
1910
1920
1930
1940
1950
1960
1940
1950



ARMCO STEEL
CORPORATION

Dollar Sales

Data expressed as percentages of their 6-year moving average.

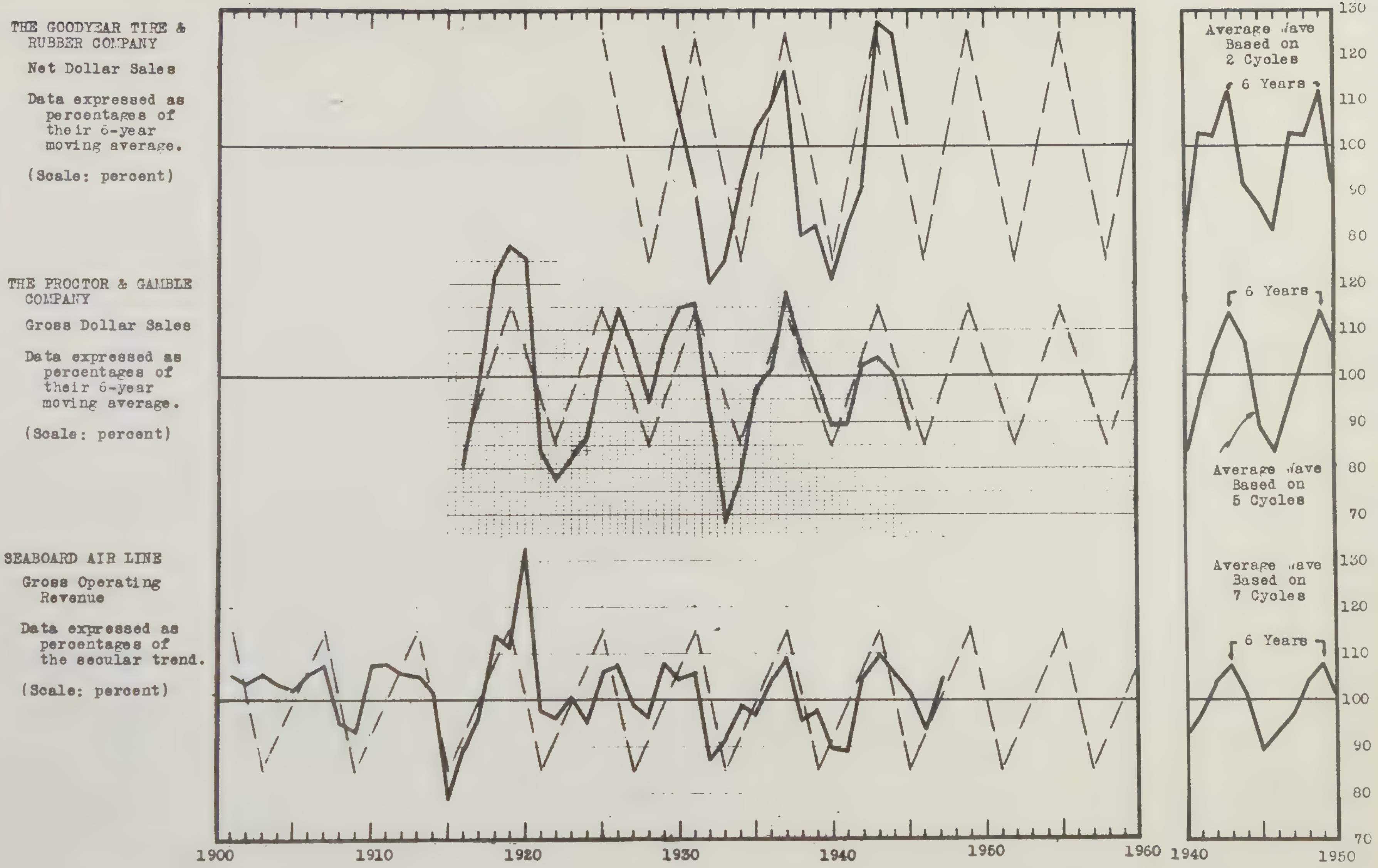
(Scale: percent)

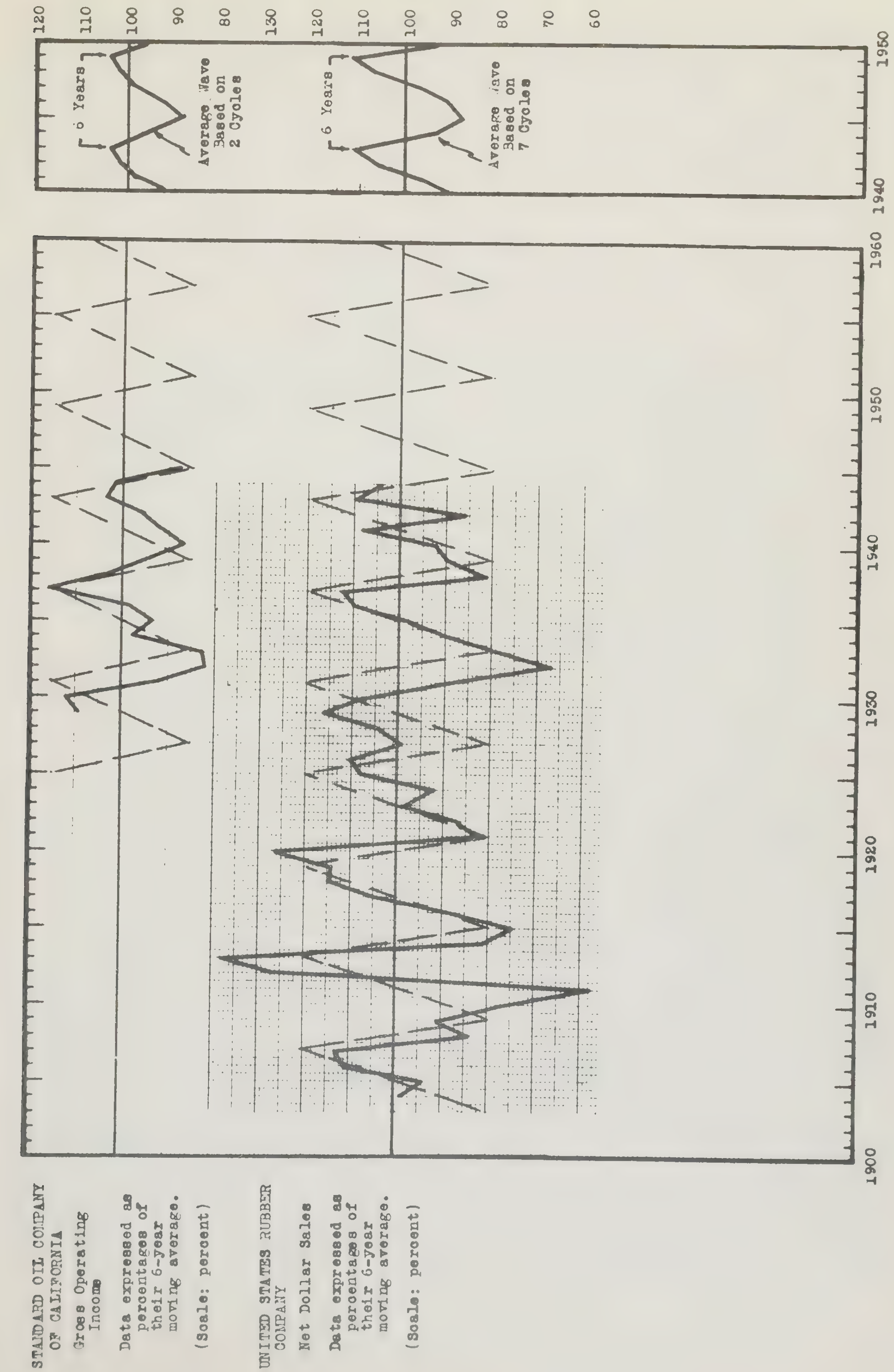
THE B. F. GOODRICH
COMPANY

Net Dollar Sales

Data expressed as percentages of their 6-year moving average.

(Scale: percent)


THE GOODYEAR TIRE & RUBBER COMPANY
Net Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
THE PROCTOR & GAMBLE COMPANY
Gross Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
SEABOARD AIR LINE
Gross Operating Revenue
Data expressed as percentages of the secular trend.
(Scale: percent)
1900
1910
1920
1930
1940
1950
1960
1940
1950
Average Wave Based on 2 Cycles
6 Years
Average Wave Based on 5 Cycles
6 Years
Average Wave Based on 7 Cycles
6 Years
130
120
110
100
90
80
120
110
100
90
80
70
130
120
110
100
90
80
70


STANDARD OIL COMPANY OF CALIFORNIA
Gross Operating Income
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
UNITED STATES RUBBER COMPANY
Net Dollar Sales
Data expressed as percentages of their 6-year moving average.
(Scale: percent)
120
110
100
90
80
130
120
110
100
90
80
70
60
6 Years
Average Wave Based on 2 Cycles
6 Years
Average Wave Based on 7 Cycles
1900
1910
1920
1930
1940
1950
1960
1940
1950

Compound Cycles

THE charts which follow should clear up for you the mystery of why cycles sometimes reverse phase—that is, why sometimes they fade out and then reappear upside down, in respect to the old time schedule. When cycles behave this way they may be compound cycles.

Both charts presented herewith were prepared by W. C. Yeatman of Los Angeles.

Fig. 1 on the page opposite shows you eight curves. Curve A at the top of the page is a series of 18-month sine waves; Curve I at the bottom of the page is a series of 15-month sine waves; and Curves B to H inclusive, in between, are various combinations (sums) of these two sorts of waves with various relative weights or amplitudes, over the full synodic period of 90 months.

The synodic period of any two waves is the least common multiple of their lengths. That is, it is the length of time required for two series of waves of different lengths which start out together to get exactly in step with each other again.

The weights or amplitudes used for each wave in each curve are indicated by the figures at the right of the curve. Thus in Curve B, an 18-month wave with an amplitude of 1.00 is combined with a 15-month wave with an amplitude of .50, or half as much.

In Fig. 2 on page 20, you can see five examples of the effect of adding together two sine waves of 15 and 16 months respectively, for various weights or amplitudes, over their full synodic period of 240 months.

In Fig. 2 the figures written in after the crest of each wage give you the length of the wave, measured from ascending node to ascending node. (The ascending node is the upward crossing of the axis.)

Now look at Curve D in Fig. 2.

Suppose you had before you only the first 110 months of this curve. You would measure the waves and find their lengths to be 15.48, 15.48, 15.49, 15.49, 15.48, 15.47, and 15.50 months respectively, or an average of about 15.48 months. You would perhaps note that the amplitude was decreasing, but you would be impressed with the beautiful regularity of timing and—unless you know about the behavior of compound waves—you would unhesitatingly project the wave into the future on a 15.48-month basis.

Oh, what pain! Only one ideal cycle later, in month 124, we get a downward crossing where we would have expected an upward crossing, and from there on our forecast is completely topsy-turvy.

These charts show you another pitfall to be avoided in cycle analysis.

When you have compound cycles present in a series of figures you will of course want to separate them into their component waves.

You can do this very easily if you have enough data.

1. The use of the Hoskins Time Chart will often solve your problem for you, at least as far as the lengths of the component cycles are concerned. (See Technical Bulletin No. 3, issued by the Foundation in 1949.)
2. Appropriate section moving averages will effect a complete separation of the component waves. (See Appendix III of **Cycles--The Science of Prediction.**)
3. Appropriate periodic tables will accomplish the same result. (For a description of periodic tables see "Multiple Harmonic Analysis" in the November 1950 report.

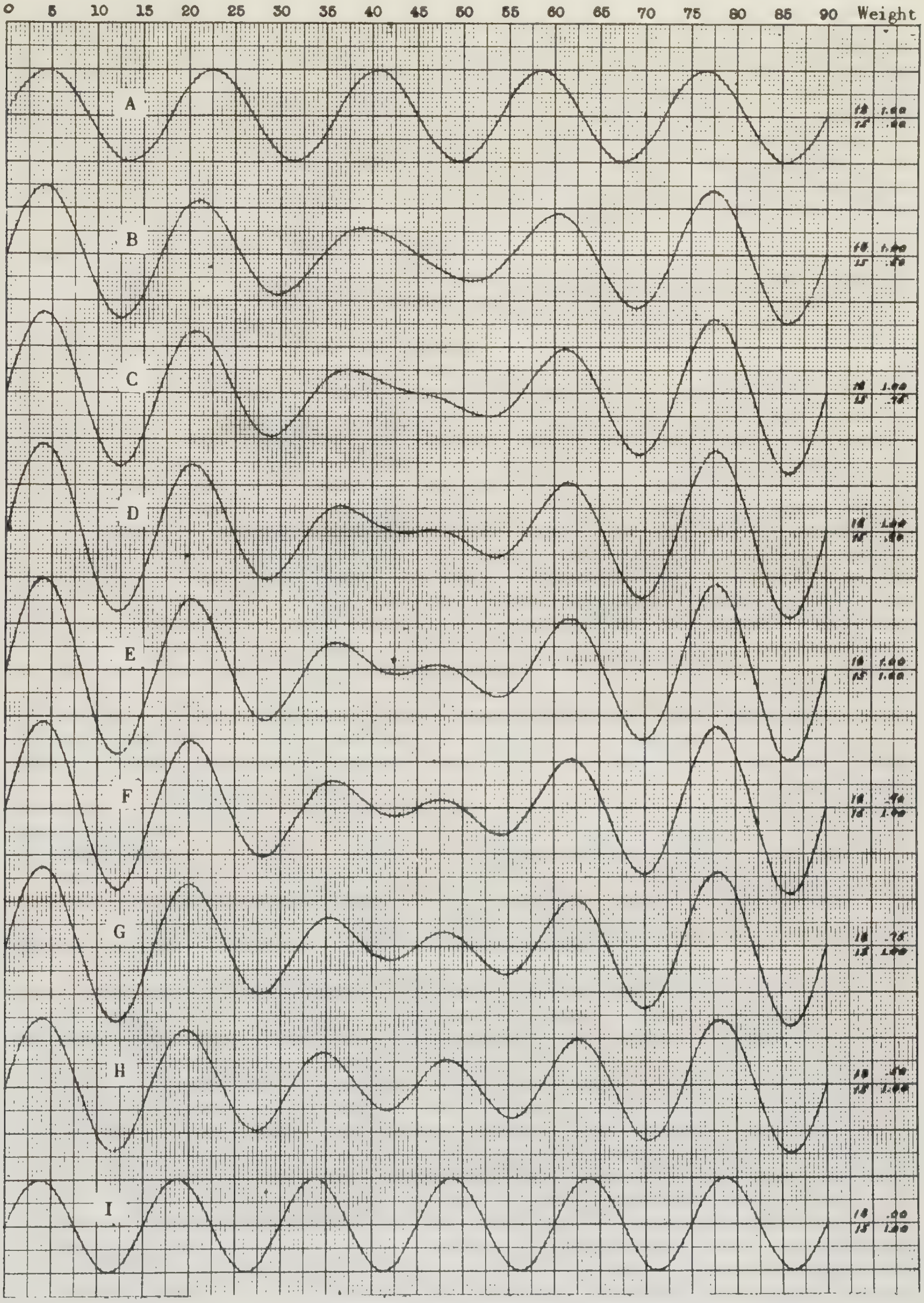


Fig. 1. Summation of 18-month and 15-month sine waves for their full synodic period of 90 months. Curve A shows the 18-month wave with an amplitude of 1.00 and the 15-month wave with an amplitude of .00—that is the 18-month wave all by itself. Curve I shows the 15-month wave all by itself. Curves B to H inclusive show various combinations of these two wave lengths with the respective amplitudes or weight as indicated in the right hand column.

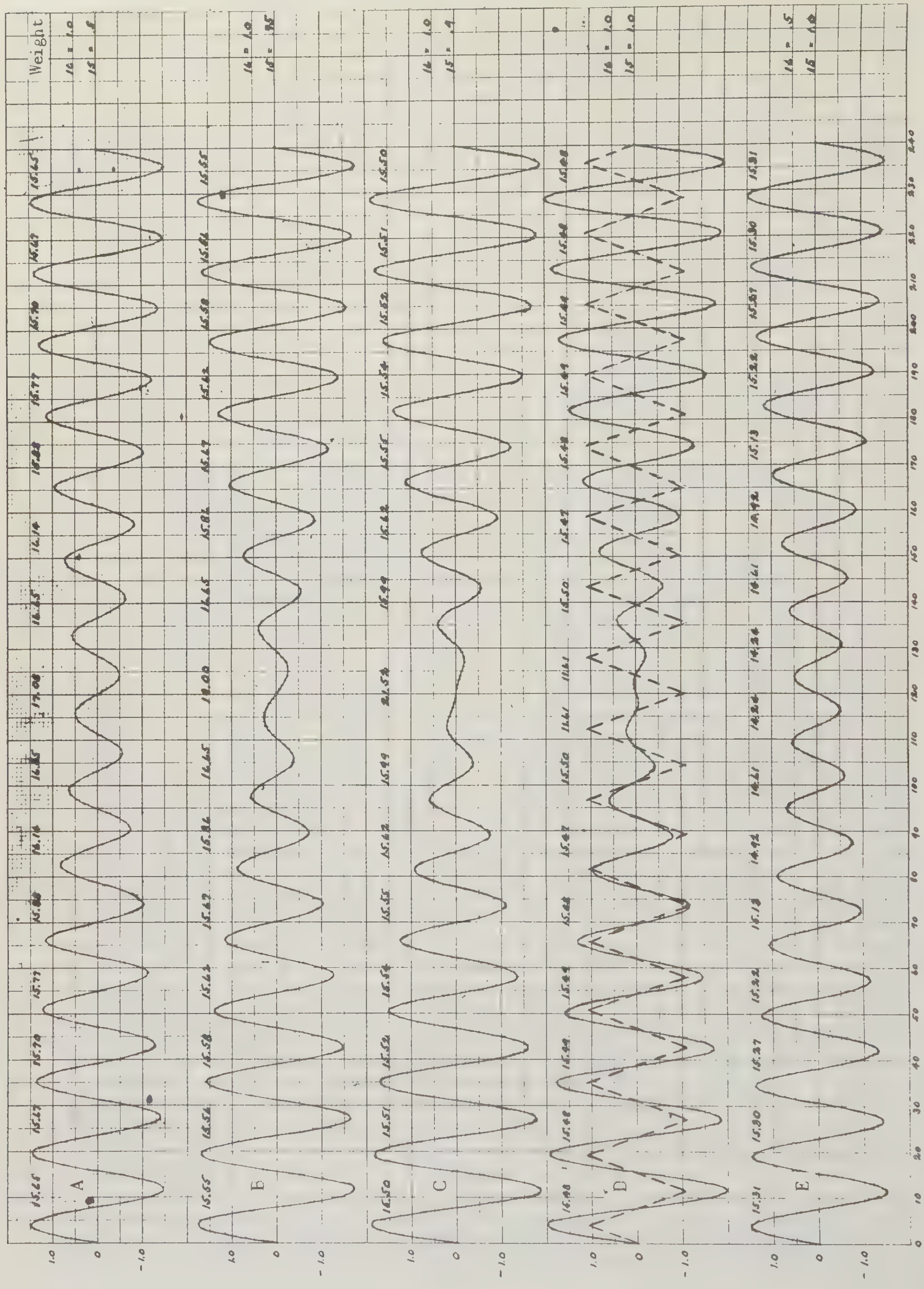


Fig. 2. Summation of 16-month and 15-month sine waves for their full synodic period of 240 months. The various curves show the results when the indicated weights or amplitudes are changed as indicated in the right hand column. The broken line in Curve D represents a perfectly regular 15.48-month cycle, as might have been erroneously assumed from the behavior of the first 110 months.

Letters

You may remember that some time ago I copied for you a paragraph from a letter of a young Japanese. I think you will enjoy reading his entire letter.

Dear Sir:-

I am very happy to write you. I have heard about your work from Mrs. Takeuchi - She is one of the teachers of the Toa Foreign Language Institute (Mission school) - by picking up out of the "Coronet (magazine)".

And I had the most interesting of it, because I have an interesting of psycology very much. Of course, in my case, it belongs to the practical psycology of the human being. (It may should be called the learning of character.-- In German, CHARAKTEROGY).

Now, I am working at the head office of the All Japan Seamen's Union in Kobe city, and I am the chief clerk (or assistant chief) of the Culture Dept. I work mainly as an acting chief editor of our journal magazine "The Seamen" (monthly), and as a helper of the International Dept.

And I am attending to the English conversation class of the Toa Foreign Language Institute at night since 6 months ago.

Recently, I inspect a period time (cycle) of my feeling in order to brush up my personality. But, it shows only a little date, because the time is so short since I started to inspect it. And I feel I must know it. I think that it is one of the firm foundation of building up our personality and of contributing to our human being society. And by knowing it, we can brush up our personality efficiently, I believe. So, I determined to write a letter to ask you about it.

Though I cannot express what I think in English sufficiently, please understand me.

I would be very happy if you send the following to me with your kindness:

(1) The List of your publication
(2) Your Journal (Periodical) [being
(3) Cycle of Instinctive Activity of the human
(4) " Feeling of "
(5) " Physical Condition of "
(6) " Intellectual Activity of "
(7) " Economic Condition in the world
(8) " Shipping Condition "
(9) " Stock Market "
(10) " Efficiency of the Industry "
(11) " Activity of Labor Union "
(12) " Education Activity of the Labor Union in the world

With every good wish for continued success in your work, I remain.

Looking forward to your kindness, I am

K. Kihata

All Japan Seamen's Union
Kobe, Japan

I answered this letter in due course, but I am afraid I was not able to give the young man answers to all his questions. However my reply was slow to reach Japan, so he wrote again, our letters crossing in the mails.

His second letter follows:

Dear Sir:-

I wrote a letter to you dated March 10, and I hope you received it. I have something to ask you again. Especially, I must ask you to teach me, because I don't know about any rule of your work.

For the fraternal good-will help of the American people, our union are wanting to build up the peaceful shipping - our union has 145,000 membership - and I think that the democratic education and the cultural cultivation of the Japanese seamen are the most important way to contribute to the peaceful human being society.

For those view, as I wrote the last letter, I endeavor to enlightenment and elevation of the cultural level of our membership, and work sincerely to edit our journal "The Seamen" as an acting chief editor now.

By the way, so far as I know, in the U.S.A,, the study of psycology is very popular and its practical use spread to most businesses and lifes. And the articles concerning psycology and health are inserted even any magazine, easy to understand and very interestingly. I believe that these very articles are very useful to the progress of each person's mind and body, and the building up of the bright peaceful society.

Never-the-less, in Japan, there is very few articles like that, even if there are some in the professional papers, they are very difficult to understand for us. But, I believe that the study and pervasion of such kind of knowledge make us know ourselves and understand the others, and they are the most significant way to the realization of democratic peace whose foundation is freedom.

And I was glad to know about your work, as I told the last letter, so I dared to write the last letter without having regard any etiquette.

Of course, I understand how your work is busy, but, for none of your reply, I'm afraid that I might let your mind injure for my ill-mannered.

To confess, I'm 29-year-old and besides my work I learn English conversation at night now, so I don't know exactly about etiquette of English correspondence and can't express what I think in English sufficiently.

And yet, the reason why I dared to write a letter to you are irrespressible desire of knowing "Cycles" and my long standing yearning to the U.S.A. which produced many free people, I think.

Please understand me as above mentioned, and I would be very happy if you grant my desire which I asked you the last letter. But, as I don't know about your situation, I would be very happy to obey your reply if you let me know about your rule, circumstance and so on.

I'm sorry to trouble you, but please don't put out this youth's light of hope.

With every good wish for continued success in your work, I remain.

Looking forward to your kind reply,

I am

K.Kihata

All Japan Seamen's Union
Kobe, Japan

Dear Mr. Dewey,

As a Swiss subscriber to your publications for many years I found in your last issue (Sept.1950), on page 17, a quotation of an article written by J.Schultz in 1941 and a book by Dr.W.Buhler published in 1940. As you say that J.Schultz gives no references in his article and as I am associated with both authors as fellow-workers I should like to draw your attention to the publication of Dr.W.Buhler "Ueber Mondenwirksamkeiten in der Nativitat" where all the exact data and numbers are given and for which work Dr.Buhler received his M.D. from the university of Freiburg.

To help in your collection and publications on rhythms I am sending you by separate post my two volumes I: "Erde und Mensch" (published 1945 at Zurich, Switzerland), and II in which you will probably find the most complete collection now existing of earthly and cosmic rhythms. Vol.I, gives a survey of daily rhythms in geophysics, meteorology and biology. Vol.II gives in Chapter IV-VII a survey of cosmic rhythms and their influence on geophysical, meteorological and biological processes on the earth.

Having been published in Switzerland, both volumes are written in German, but you will certainly find a fellow-worker able to translate the essential passages. For all facts the exact indications of sources, literature etc. are given in the footnotes.

On page 169 of Vol.II I have also referred to your publications and I hope that this will draw the attention of Swiss and other European readers to your work.

I hope that the two volumes will help you in showing how many exact proofs are already available for the existence and effects of rhythms in the most different fields of scientific investigation.

Yours very sincerely
Dr.G.Wachsmuth

Dornach n. Basle
Switzerland

I am very grateful to Dr. Wachsmuth for his gift. The books have just arrived.

My dear Mr. Dewey:

It occurs to me that there is one study that I would like very much to have made. And I can imagine that there are at least a million other people in the United States who would read such a study with interest.

This is a study of the past wars in which the United States has been embroiled, and a prediction as to when the next war will occur.

I have noticed that these wars have occurred periodically, and would like to know the conclusions that might be drawn as to when the next one would be along.

I do not think that this would be too difficult since the data is absolutely available almost to the day in every case.

And I am wondering if it wouldn't be a very popular output from the standpoint of popular interest.

With kindest regards, I am,

Yours very sincerely,
Dean B Gregg

Winter Park, Florida

Dear Mr. Dewey:

Resolution 9 of the Fourteenth Conference of Provincial and Dominion Wildlife Officials, 1950, placed on the Canadian Wildlife Service the responsibility for collecting available information about results obtained by investigators of cycles in wildlife in Canada, so that it might be more readily consulted.

We shall therefore appreciate it if you will let us know of any information of this kind, with appropriate notations as to where and how it may be obtained.

Your suggestions as to other persons from whom we should seek such information will also be appreciated.

Harrison F. Lewis, Chief
Canadian Wildlife Service
Department of Resources and Development
Ottawa, Canada

Will members please write Dr. Lewis direct.

Foundation Affairs

As December rolls around it seems fitting to review the affairs of the foundation for the year 1950.

What are our achievements?

1. I suppose the most important achievement of the year is the inauguration of our monthly report.

This report makes it possible for us to get a record of our research, and the research of others, into libraries and universities in a form in which it can be bound for permanent reference.

Reports projected for next year, including the reprints which we plan to bind in with them, will total about 400 pages.

2. It seems to me that the second most important achievement of the year is the fact that during the period we have become very nearly self-supporting. I hope that in a year or two we can become entirely self-supporting.

When you come to think of it, that is not bad for a scientific research agency without any endowment.

The increase in our minimum dues has cost us the loss of 110 members, but so far this year in their place we have 136 new members, so we are better off numerically and better than twice as well off financially.

Now for a detailed report:

Reprints

During the year we published and sent you four new reprints, as follows:

No.31. Season of Birth, by Ellsworth Huntington.
No.32. Biological Rhythms and Cycles, by Nathaniel Kleitman.
No.33. Are There Periods in American Business Activity? By E.B.Wilson.
No.34. Cycles and Tree-Ring Widths, by C.G.Abbot.

In addition we reissued and sent you Reprint No. 9, Periodic Inspiration in Poetry and Music, by J.H.Douglas Webster.

We save so much money by the present plan of issuing our reprints as supplements to our monthly reports that we are hoping to send you at least eight reprints during 1951.

For the benefit of our new members one or two of these may be reissues of especially popular reprints issued in former years.

Research

Results of research published and sent you during the year include the following:

(Items marked with a star were sent you only at your specific request. The word Data indicates inclusion of the actual figures along with the results of the research.)

The 6-Year Rhythm in General Electric Orders. Data. Two reports were issued - one of which was sent only upon request.
The 33-Month Rhythm in the Ton Miles of the Canadian Pacific Railway.
Major War Price Cycles.
The 9 2/3-Year Cycle in the Abundance of Lynx; Data.
Cycles in Weather: Rainfall in the United Provinces, India. The 9 2/3-Year Rhythm. Data*.
Hint of a 6-Year Rhythm in Tree Rings. Data.*
Hint of a 17 ¾-Year Rhythm in Tree Rings. Data.*
Hint of a 54-Year Rhythm in Tree Rings. Data.*
Cycles in Commercial Failures.
The 17 2/3-Year Rhythm in Commercial Failures. Data.*
The 14 ¾-Year Cycle in the Number of Strikes. Data.
The 22 1/5-Year Cycle in Relative Sunspot Numbers. Alternate Cycles Reversed. Data.
The 18-Year Cycle in Sunspots, Alternate Cycles Reversed.
The 41-Month Rhythm in Common Stocks.
The 29 ½-Day Cycle in the Births of Infants. Data.
The 22-Year Cycle in Wholesale Prices.
The Seasonal Cycle in Intellectual Interests.
The 9-Year Cycle in New Members of the Presbyterian Church, U.S.A. (Northern). Data
The 8-Year Cycle in Cigarette Production. Data
Seasonal Patterns of Insanity, Suicide and Crime.
The Daily Cycle in the Body Temperature of Birds.
The 6-Year Cycle in Automobile Sales. Data.
The 6-Month Cycle in the Electric Potential of Trees.
The 3- to 3 ½-Year Cycles in American Business Activity, 1790 to 1946.
Long Cycles in Cotton Prices.
The 6-year cycle in the stock market.
The 6-year cycle in barometric pressure.
The 6-year cycle in sunspots.
The 6-year cycle in cotton prices.
The 6-year cycle in rayon production.
The 6-year cycle in cotton production.

The 6-year cycle in shipments of American Viscose Corp.
The 6-year cycle in production of the Bethlehem Steel Corp.
The 6-year cycle in sales of E.I. Du Pont
The 6-year cycle in sales of Inland Steel Co.
The 6-year cycle in sales of Jones & Laughlin Steel Corp.
The 6-year cycle in sales of Monsanto Chemical Co.
The 6-year cycle in sales of Montgomery Ward & Co.
The 6-year cycle in sales of Pgh. Plate Glass Co.
The 6-year cycle in sales of Allis Chalmers
The 6-year cycle in sales of Armour and Company
The 6-year cycle in production of the Republic Steel Corp.
The 6-year cycle in sales of Sears Roebuck
The 6-year cycle in sales of Youngstown Sheet and Tube Co.
The 6-year cycle in sales of Wilson & Co.
The 6-year cycle in income of the Continental Oil
The 6-year cycle in sales of the National Lead
The 6-year cycle in sales of Swift & Co.
The 6-year cycle in sales of Armco Steel Corp.
The 6-year cycle in sales of the B.F. Goodrich
The 6-year cycle in sales of the Goodyear Tire & Rubber Company
The 6-year cycle in sales of the Proctor & Gamble
The 6-year cycle in gross operating revenue of the Seaboard Air Line
The 6-year cycle in gross operating income of Standard Oil of California
The 6-year cycle in sales of the U.S. Rubber Co.

Early in the year, we embodied our research in reports which were sent out free on request. We hoped that the people interested in tree rings and climate, for example, would write in for tree ring reports, the people interested in animals would write in for biological reports, the people interested in business would write in for the economic reports, and so on.

But it did not work out that way. Some members seem to write easily, and asked for almost everything that came along. Others for one reason or another never asked for anything. The result was a concentration of the reports instead of a diffusion. Some people got much more than their share-others did not get anywhere nearly enough.

The new policy of publishing digests of the research in the monthly report seems to be more equitable, in the light of experience.

Technical

During the year we did what we could to help you with your technical problems. In particular we sent you the following (items marked with a star sent only at your request):

Cycle Analysis: The Moving Average*
The Yeatman-Lane Modified Moving Percentage, and the Lane Weighted Moving Average (two releases)
How to Get Hints of Cycles - in two parts
Hoskins Standard Month Numbers
Does a 6-Year Moving Average Make a 6-Year Wave?
The Bagno-Works Analyzer and Synthesizer
Multiple Harmonic Analysis

I am hopeful that eventually all of this technical matter can be rewritten in the form of a book that will tell you how to make a cycle analysis from beginning to end.

Miscellaneous Releases

Fourth Quarterly Letter of 1949.
First Quarterly Letter of 1950.
A memorandum entitled " Source Material for the Cycle Analyst."
A memorandum entitled " What Cycles to Study First."
List of Publications of the Foundation.
List of Activities of the Foundation.
A memorandum in regard to the May 2nd meeting of the Foundation.
Miscellaneous material such as Letters, Additions to the Library, Financial, Questions and Answers, etc.

The Institute

In June we held a week-long Institute so that you could, if you wished, learn all about various techniques for the detection, isolation and evaluation of cycles.

Meetings

Four meetings were held during the year. The dates, speakers and subjects were as follows:

February 2 General Discussion on how to discover and isolate cycles.
May 2 Gerould T. Lane, " The Forty Month Cycle in Common Stocks and the Variation in Length During Alternate Sunspot Cycles"
June 27 Demonstration of the Bagno-Works Electric Cycle Analyzer and Synthesizer
November 1 Neal J. Heines, " Sunspots "

The next meeting is scheduled for January 17th at 5:30 p.m. It will be held at the American Museum of Natural History in New York City. Chapin Hoskins will speak.

Questions and Answers

Question: Will depression and inflation periods continue to become more severe as our economy expands?

Answer: The absolute change between crest and trough will probably continue to become more severe as our economy expands unless something is done to change the situation, but there is no evidence that I know about to make one believe that the percentage change between crest and trough is likely to become greater as our economy expands.

* * * * *

Question: Please explain the adding of various cycles, as diagrammed in Fig. 16 and Fig. 17 on page 65 of **Cycles - The Science of Prediction.**

Answer: For your convenience these two charts are reproduced on the page following. Each cycle has a value for each year. These values can be added together algebraically to get the combined effect of both cycles.

For example, in Fig. 16 the 3-year cycle starts out at + 12, one and a half years later it is down to – 12, an overall move of 24 points in a year and a half, or 16 points in one year.

Sixteen points down from + 12 is – 4 and therefore the value for one year after base is – 4; the value for 2 years after base is also – 4; for 3 years after base it is + 12 again, and so on.

The 4-year cycle also happens to start out at + 12. It goes down 24 points in 2 years, or 12 points in a year. this gives one year after base a value of 0; 2 years after base a value of – 12; 3 years after base a value of 0; 4 years after base a value of + 12, and so on.

To get a crude value of the combined effect of both waves, one merely adds the two cycles together as shown in Table 1 on page 26.

As indicated, Fig. 16 was taken from a book by Warren & Pearson. In this book these authors averaged the sum obtained by adding together the 3-year cycle and the 4-year cycle. I do not know why they did this.

In Fig. 17, also reproduced on the page 26, the 6-year cycle starts out at – 20 and 3 years later has reached +20, 3 years later or 6 years from the beginning, the 6-year cycle is down to – 20 again. Thus, in each year the 6-year cycle goes up or down 13 1/3 points. Consequently, in the first year after base its value is 13 1/3 points above -20 or -6 2/3. In the second year it has a value of +6 2/3, in the third year a value of +20, in the fourth year a value of +6 2/3, etc.

The 8-year cycle shown also goes from -20 to +20 or an overall move of 40 points in four years, or 10 points a year. Consequently, one year after base, this 8-year cycle is at -10, and two years after base, it is at 0, three years after base it is at +10, four years after base it is at +20, five years after base at +10, etc.

To combine these two waves, one merely adds these values algebraically, as shown in Table 2 on the following page.

For more accurate work and especially where the waves are large, the values should be expressed as percentages and should be multiplied together. That is, instead of adding 12 to 12 and calling it 24, one should get the value of the crest of two 12% waves by taking 112% of 112% which, of course, is 125.44%. Similarly, the troughs of two 12% waves coming together would be 88% of 88% or 77.44%, (or -22.56%) of trend. You should make similar computations for the value of each wave at each point of your series.

Table 1

	Base Year	Years after base year 1	2	3	4	5	6	7	8
3-YEAR CYCLE	+12	-4	-4	+12	-4	-4	+12	-4	-4
4-YEAR CYCLE	+12	0	-12	0	+12	0	-12	0	+12
TOTAL	+24	-4	-16	+12	+8	-4	0	-4	+8
AVERAGE	+12	-2	- 8	+6	+4	-2	0	-2	+ 4

Table 2

	Base Year	Years after base year 1	2	3	4	5	6	7	8
6-YEAR CYCLE	- 20	-6 2/3	+6 2/3	+ 20	+6 2/3	-6 2/3	-20	-6 2/3	+6 2/3
8-YEAR CYCLE	- 20	- 10	0	+ 10	+ 20	+ 10	0	- 10	-20
TOTAL	-40	-16 2/3	+6 2/3	+30	+26 2/3	+3 1/3	-20	-16 2/3	-13 1/3

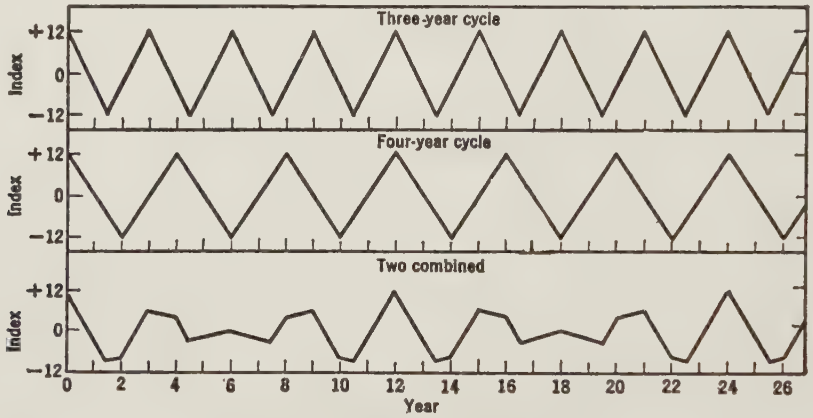


FIG. 16. SYNTHESIS OF TWO CYCLES

Regular 3-year and 4-year cycles, and the two combined. The sum of the two repeats every 12 years. (After Warren and Pearson.)

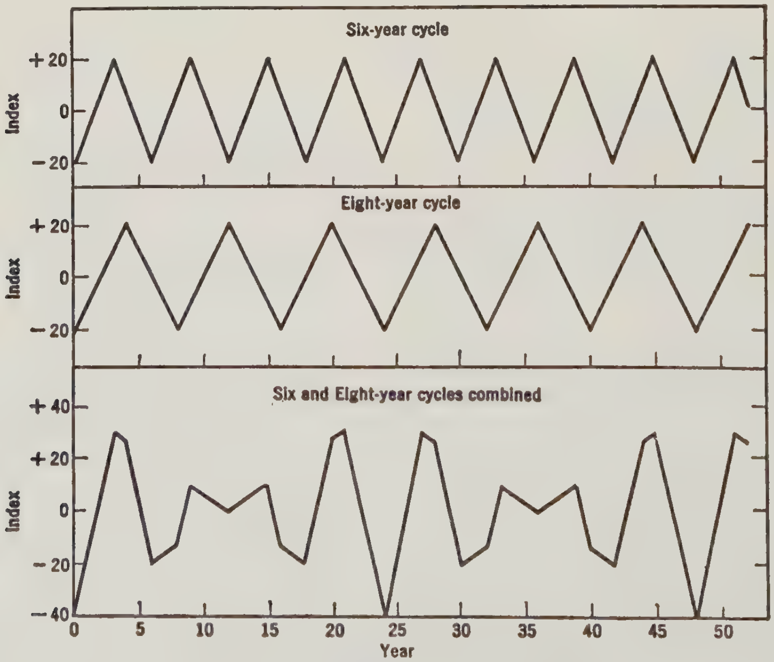


FIG. 17. SYNTHESIS OF TWO CYCLES

Regular 6-year and 8-year cycles, and the two combined. The sum of the two repeats every 24 years. (After Warren and Pearson.)

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CYCLES IN TREE-RING WIDTHS

By C. G. ABBOT
Secretary, Smithsonian Institution

In my paper " Solar Radiation and Weather Studies "[1], I showed that the variation of the sun's emission of radiation since 1920 is the summation of at least 12 periodicities ranging from 7 months to 23 years in length. All of them are approximately, perhaps exactly, aliquot parts of 23 years. Hence, 23 years is a cycle wherein we might expect the weather and things dependent on it would show marked recurring features. Furthermore, although hitherto mathematical analysis has not disclosed why the sun's radiation should exhibit a fundamental and many overtones like a violin string, yet since observations show that it does so, it may well be that the fundamental is not 23 years, but 46, 92, or some other multiple of 23 years.

In my paper just cited I went on to show that all of the solar periodicities are also found in weather records of six stations (one of them, Adelaide, Australia, by the way) during the past century. Moreover, the 23-year cycle is to be found in varves of glacial age, in widths of tree rings in California and the West, in the levels of lakes and rivers, in the weather of the United States, and in other phenomena. It proved also that in many phenomena, and notably so in the levels of the Great Lakes and in the associated droughts in the Northwest, the 46-year cycle is predominant.

Recently Prof. C. J. Lyon, of Dartmouth College, has published a paper[2] on his measurements of widths of tree rings at six localities in Vermont and New Hampshire. My attention was particularly drawn to his figure 3, wherein he plots the average results through the whole range of time they cover. The locality Fairlee, Vermont, has the longest record, extending from 1544 to the present time, almost four centuries. Having graduated a slip of paper in 23-year intervals, I thought I could see in Professor Lyon's diagram a well-marked cycle of variation of this period throughout the entire series.

Professor Lyon has been so kind as to send me his original observations on the trees at Fairlee, and has graciously consented to let me

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[1] Smithsonian Misc. Coll., vol. 94, no. 10, 1935.

[2] Ecology, vol. 17, no. 3, July 1936.

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publish a statement of my reduction of them from the point of view of the 23-year cycle.

In the first place, the range of tree-ring widths is very great. After 1800, the widths as measured averaged several times as great as from 1544 to 1720. Hence for a fair comparison I thought it necessary to first approximately reduce all the data to a common scale. That such a reduction might not introduce a deformation of any 23-year cycle, I made the reductions at intervals which were in every case multiples of 23 years after 1544. The factors employed were as follows:

Interval	1544-1727	1728-1796	1797-1842	1843-present
Reduction Factor.....	1.0	0.8	0.4	0.3

With these changes the resulting mean tree-ring widths from Professor Lyon's measurements for Fairlee, Vermont, are as shown in table 1.

The values are arranged in 17 successive cycles of 23 years each. At the head of each column stands the first year of the cycle, so that the dates corresponding to all values may readily be obtained.

It was soon noted that every fourth cycle, the 1st, 5th, 9th, 13th, and 17th, differed decidedly in type from the average form of the others. This is but to say, of course, that there is a pronounced 92-year cycle in the tree-ring widths. It was noted, too, that five of the cycles, some belonging to the group just mentioned, some to the majority group, were partly intermediate between this type and the prevailing type of the 23-year cycle fixed by the remaining twelve cycles. These of intermediate type are the 2d, 7th, 9th, 10th, and 13th. Columns 18, 19, and 20 of the table give the mean forms of the three types just described. They are shown graphically in figure 1 C, A, B.

The range in widths of the prevailing mean form is about 50 percent, and that of the 92-year type about 70 percent, as based in each case on the smallest mean values. A large difference in average widths also distinguishes the two types. The average width for the mean of the five cycles (curve C) is 0.41 and that of the mean of the twelve (curve A) is 0.50, a range of 22 percent.

I have also sought to discover a periodicity of 46 years in the tree-ring widths for Fairlee. For this purpose the values were arranged in eight columns of 46 successive years each. The last column ends with the year 1911. It was soon noted that the columns alternately revealed forms of contrasting types. In figure 1, D, E, I show the mean form of the odd-numbered 46-year cycles in the lower curve, and the

TABLE I.—*23-Year Periodicities*

1 1544 to 1566	2 1567 to 1589	3 1590 to 1612	4 1613 to 1635	5 1636 to 1658	6 1659 to 1681	7 1682 to 1704	8 1705 to 1727	9 1728 to 1750	10 1751 to 1773	11 1774 to 1796	12 1797 to 1819	13 1820 to 1842	14 1843 to 1865	15 1866 to 1888	16 1889 to 1911	17 1912 to 1934	18 Mean of 1-5-9-13-17	19 Mean of 2-4, 6-8, 10-12, 14-16	20 Mean of 2-7-9-10-13
2.4	2.4	3.0	5.4	6.0	4.0	4.2	3.6	5.6	5.8	4.8	2.9	3.8	3.1	6.1	6.4	3.4	4.2	4.2	4.4
2.4	3.0	4.2	4.8	6.0	3.6	4.2	5.4	6.6	6.2	5.8	2.2	3.6	4.4	5.8	7.6	4.3	4.6	4.6	4.7
4.2	3.6	3.0	4.8	7.0	2.9	4.8	4.2	6.7	5.8	5.6	2.4	4.3	4.4	5.1	6.7	3.8	5.2	4.4	5.0
4.8	3.0	3.0	6.1	4.8	2.3	4.8	3.7	7.7	5.8	7.7	2.8	5.2	3.2	3.2	7.3	4.4	5.4	4.3	5.3
3.6	3.7	3.6	4.8	3.7	2.6	4.8	4.8	6.6	5.3	6.8	3.6	4.8	3.3	5.0	7.0	5.5	4.8	4.4	5.0
3.6	3.6	3.6	4.3	3.6	3.7	4.8	3.2	6.6	7.2	5.8	4.2	4.5	5.2	4.7	5.0	3.7	4.4	4.6	5.3
3.6	3.7	3.6	6.0	4.8	3.0	4.8	4.2	7.7	6.6	7.7	4.0	3.5	4.5	3.8	4.4	2.6	4.4	4.6	5.3
1.2	4.8	4.7	4.8	4.8	2.5	5.4	5.0	6.7	5.3	6.6	3.4	5.0	2.2	3.2	5.0	3.7	4.3	4.1	5.4
2.4	4.8	5.4	5.7	4.0	3.5	5.0	3.0	6.6	6.7	6.8	4.6	5.3	7.1	5.2	5.7	2.6	4.2	5.1	5.7
2.4	6.0	3.7	4.8	2.4	3.6	3.6	4.7	7.7	7.7	6.2	3.4	4.2	5.6	5.3	7.8	4.7	4.3	5.4	5.8
2.4	6.0	5.0	6.0	2.4	3.6	4.8	5.4	7.2	6.7	5.8	5.3	4.8	4.5	4.6	4.4	3.9	4.1	5.2	5.9
1.8	6.0	4.2	6.0	3.6	2.5	5.4	3.2	6.2	5.6	6.6	5.1	4.9	4.2	3.8	3.8	2.8	3.9	4.6	5.6
2.8	3.6	6.0	8.4	3.1	5.4	4.3	5.0	6.7	6.2	8.6	5.8	4.1	4.9	5.6	4.3	3.8	4.1	5.4	5.0
2.8	4.2	6.0	9.6	2.4	4.8	6.0	6.6	4.8	7.7	8.2	6.2	5.5	6.4	4.5	6.7	4.0	3.9	6.5	5.6
2.5	5.0	5.4	7.2	2.4	5.4	5.4	6.0	5.8	5.3	8.2	7.4	5.8	6.2	6.6	6.5	3.9	4.1	6.1	5.5
2.5	4.7	4.8	6.6	3.2	6.6	4.8	6.0	4.0	4.0	6.8	6.8	4.0	6.2	4.5	4.8	4.2	3.6	5.9	4.3
4.8	3.7	4.2	7.0	3.6	5.4	4.8	7.3	5.3	3.8	5.3	4.9	3.0	4.3	6.0	4.4	4.6	4.3	5.1	4.1
3.6	3.0	3.7	7.0	3.6	6.0	4.0	5.4	5.3	3.8	4.8	5.5	3.0	5.5	4.3	4.3	4.8	4.1	5.1	3.8
3.6	3.7	4.8	5.0	4.2	6.0	3.0	3.6	5.3	5.8	4.3	6.6	4.5	5.0	4.6	3.7	2.6	4.0	4.9	4.5
3.6	2.4	4.8	4.8	2.5	6.6	4.2	6.0	5.3	4.8	5.8	5.4	3.2	4.4	3.7	3.7	1.8	3.3	4.8	4.0
3.6	2.4	5.4	4.8	4.7	4.2	4.2	6.0	3.8	5.8	5.6	5.2	3.6	5.9	5.0	3.1	2.0	3.5	4.7	4.0
3.6	3.0	4.8	5.4	3.6	6.0	4.2	7.0	3.8	5.8	5.8	4.6	3.4	4.7	4.6	3.8	1.4	3.2	5.0	4.0
3.0	3.6	4.8	4.0	2.5	6.0	3.5	7.0	4.8	5.8	5.8	4.7	5.4	4.3	4.9	2.6	1.1	3.4	4.8	4.6

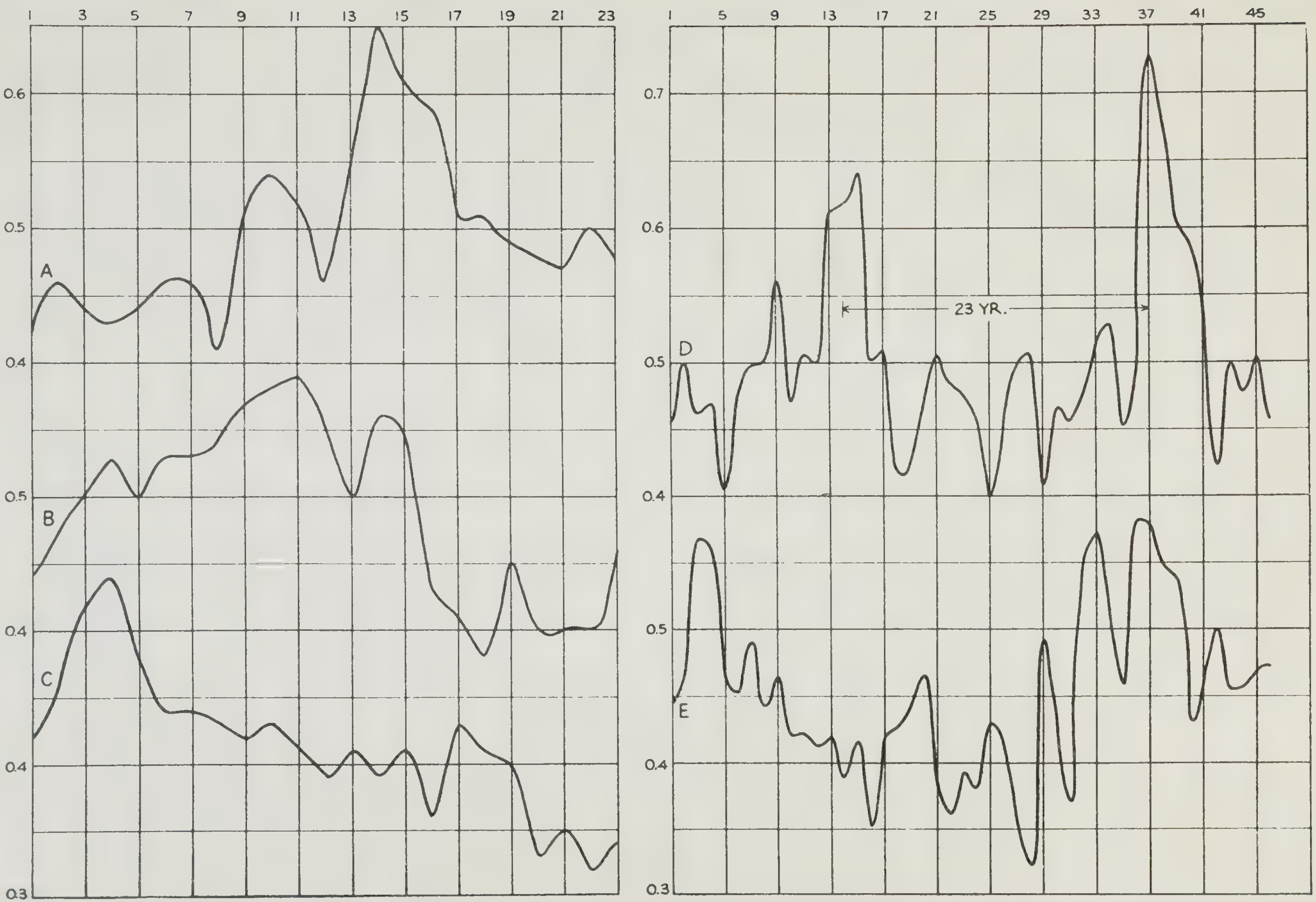

FIG. 1.—Cycles of 23, 46, and 92 years in tree-ring widths, Fairlee, Vermont.

A, the usual 23-year cycle, mean of 12 recurrences. B, an intermediate form of 23-year cycle, mean of 5 recurrences. C, the 23-year cycle which occurs once each 92 years, mean of 5 recurrences. D and E, alternate forms of the 46-year cycle. Each is the mean of 4 recurrences which occur in regular alternation in these contrasting forms. The 23-year cycle shown in D therefore confirms the 92-year cycle shown in C.

mean form of the even-numbered 46-year cycles in the upper curve. It will be observed at once that they differ in that the upper curve shows a strong 23-year cycle additional to that of 46 years, while in the lower curve this feature is missing. This, of course, is but to emphasize the fact already brought out above, namely, there is a strong 92-year cycle besides those of 23 and 46 years.

I suspect that meteorologists are rather inclined to distrust the origin and existence of the 23-year cycle which was indicated in my former paper as arising from the variability of solar radiation and expressing itself in weather and many phenomena depending thereon. Their hesitation is no doubt due to the smallness of the percentage and the absence of a theory of the solar variations, and to the reversals of phase which occur in the terrestrial manifestations of the subordinate solar periodicities, as strikingly illustrated in figures 16 and 17 of my paper "Solar Radiation and Weather Studies". I have still nothing to offer but statistical proofs of the important influences of the many periodicities integrally related to 23 years, but I feel somewhat supported in my conclusions by the recent paper of E. A. Cornish[3] on the precipitation at Adelaide, Australia, and the unreserved acceptance of this period as real by Dr. F. J. W. Whipple while he criticized the method of Mr. Cornish in presenting it.

In closing, I may draw attention to an important inference from this study of Professor Lyon's measurements of the tree-ring widths at Fairlee, Vermont. The 46-year cycle seems to be clearly in evidence since the year 1544, and covering eight recurrences of it. Counting back from the year 1911 when the eighth cycle ends (see curve D, fig. 1), we find that the low phase, corresponding no doubt to deficient water supply, ended about 1896. Now referring to figure 26 B of my paper "Solar Radiation and Weather Studies", the low phases of Lakes Huron and Erie also ended about 1896, and also 46 years previously thereto, at the ends of the great droughts of the forties and the nineties of the nineteenth century in our Northwestern States. Does not this long-continued series of 46-year precipitation cycles at Fairlee plainly warn us of the probable recurrence of a major drought beginning soon after the year 1975, and lasting about 10 years?

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[3] Quart. Journ. Roy. Met. Soc., vol. 62, p. 481, 1936.

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PERHAPS because all of us are human beings, there seems to be something of irresistible interest in the rhythms of human emotion.

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Do women have these cycles or rhythms that Professor Hersey speaks of in addition to the four-week and two-week cycles of sex desire that have been noted? Are the rhythms for any individual immutable in length? Where two or more persons have rhythms of identical length, do the peaks come at the same calendar time or is there a tendency for grouping?

Are there longer rhythms of six months, a year, two years, three years that Professor Hersey's methods are not designed to bring out? Do some individuals have two or more rhythms present concurrently? Are there rhythms of identical length in the ups and downs of phenomena that, by their existence, might give a hint as to possible cause for the emotional rhythms discovered by Professor Hersey? These are some of the questions that come to mind as one reads the paper that follows.

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Back in 1876, a self-styled "Ohio farmer" named Samuel Benner published a book called **Benner's Prophecies of Future Ups and Downs in Prices**. This book is reprinted in these pages as one of the curiosa of cyclic literature. For the convenience of the reader, and to preserve our usual format, four pages of Benner's book will be combined to make one page of reprint.

In a crude sort of way, Benner made cycle analyses of pig iron prices, hog prices, corn prices, cotton prices, and panics.

He said in effect that pig iron prices were dominated by a nine year cycle, the tops of which came within one year of perfect timing, and the bottoms of which came within two years of perfect timing. Benner attached significance to the variations from perfect timing, and stated that the tops came at 8, 9, and 10 years apart, and repeat; the bottoms at 9, 7, and 11 years, and repeat.

Benner observed alternate five and six year cycles in hog prices and corn prices. (Apparently the idea of a 5½-year cycle, as such, did not occur to him). He noted an 11 year cycle in cotton prices.

Finally, Benner observed a cycle of 18 years in panics, with variations of not more than two years one way or the other. He attached importance to these variations also, believing that the sequence of 16, 18, and 20 years, and repeat, had significance.

In spite of the fact that Benner announced conclusions apparently quite unwarranted by available evidence, subsequent history has to some degree born him out. Pig iron prices from 1875 to date have in truth evidenced a 9-year rhythm; and even the sequence of departure from perfect timing as set down by Benner seems to have had significance. That is, although one would have made money by buying and selling pig iron according to a true 9-year rhythm, one would have made more money by buying at the 7, 9, and 11-year lows, and selling at the 8, 9, and 10-year tops set forth by Benner. This last named method would have yielded 252% gross profit and 9% loss, or a net profit of 243% in the period from 1875 to date.

In corn prices the 5½-year rhythm indicated by Benner has continued up to the present time, although it has not dominated the situation to the extent that it did in the period under review in the **Prophecies**. Nevertheless, sales and short sales on the Benner formula from 1875 to date will show net profits of 450%....

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